THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXII. No. 1849.] LONDON, OCTOBER 18, 1898. [50TH YEAR. PRICE 6d.

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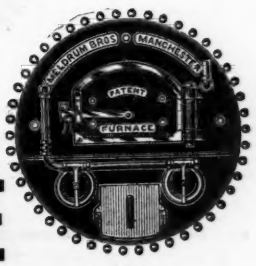

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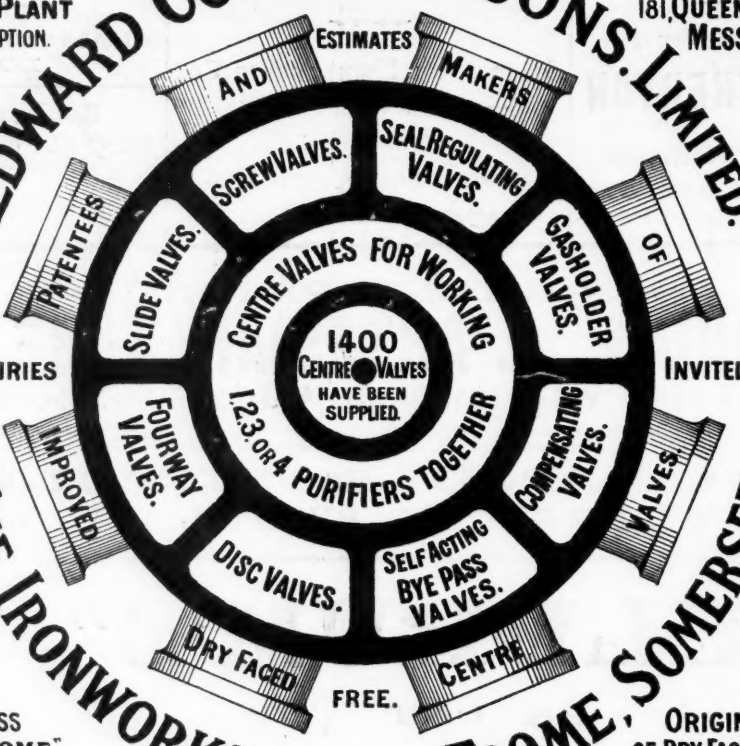

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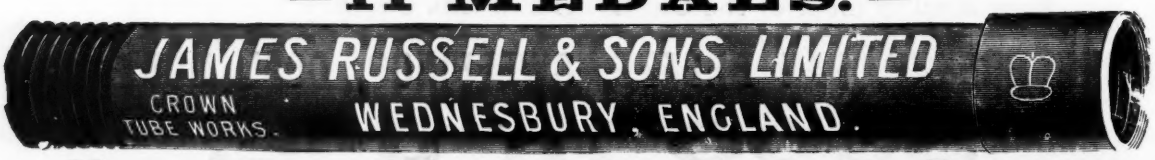

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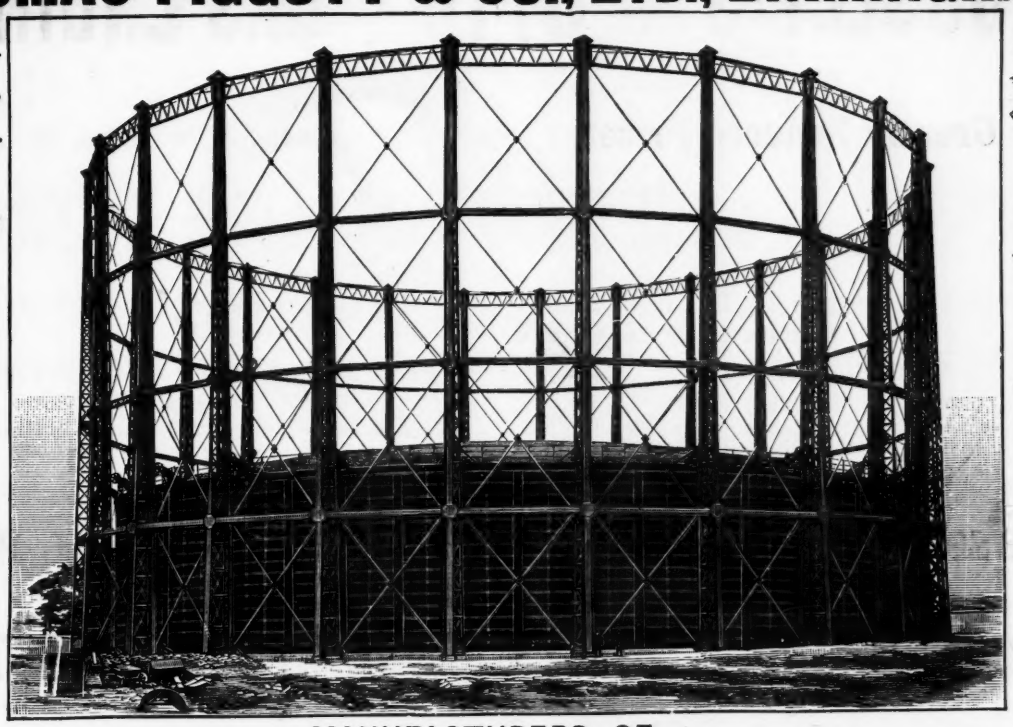

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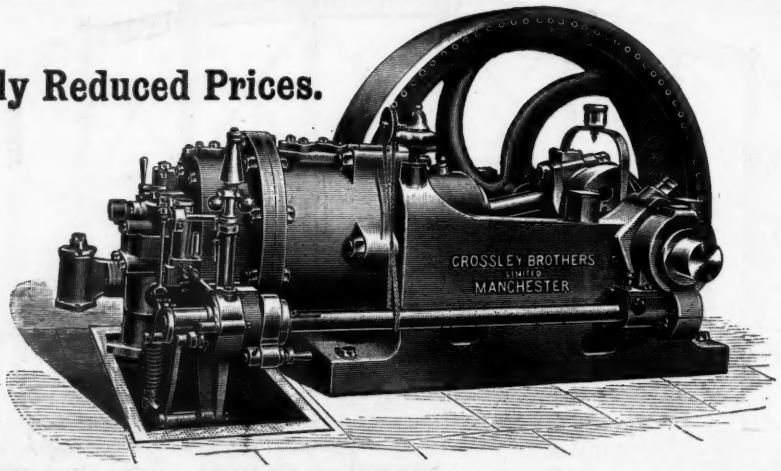

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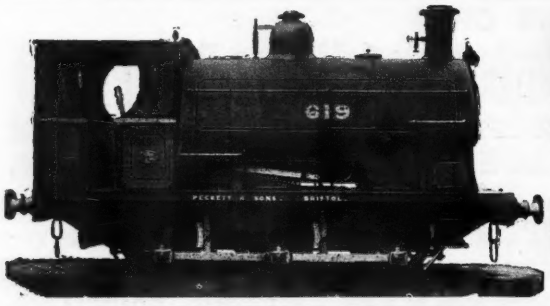

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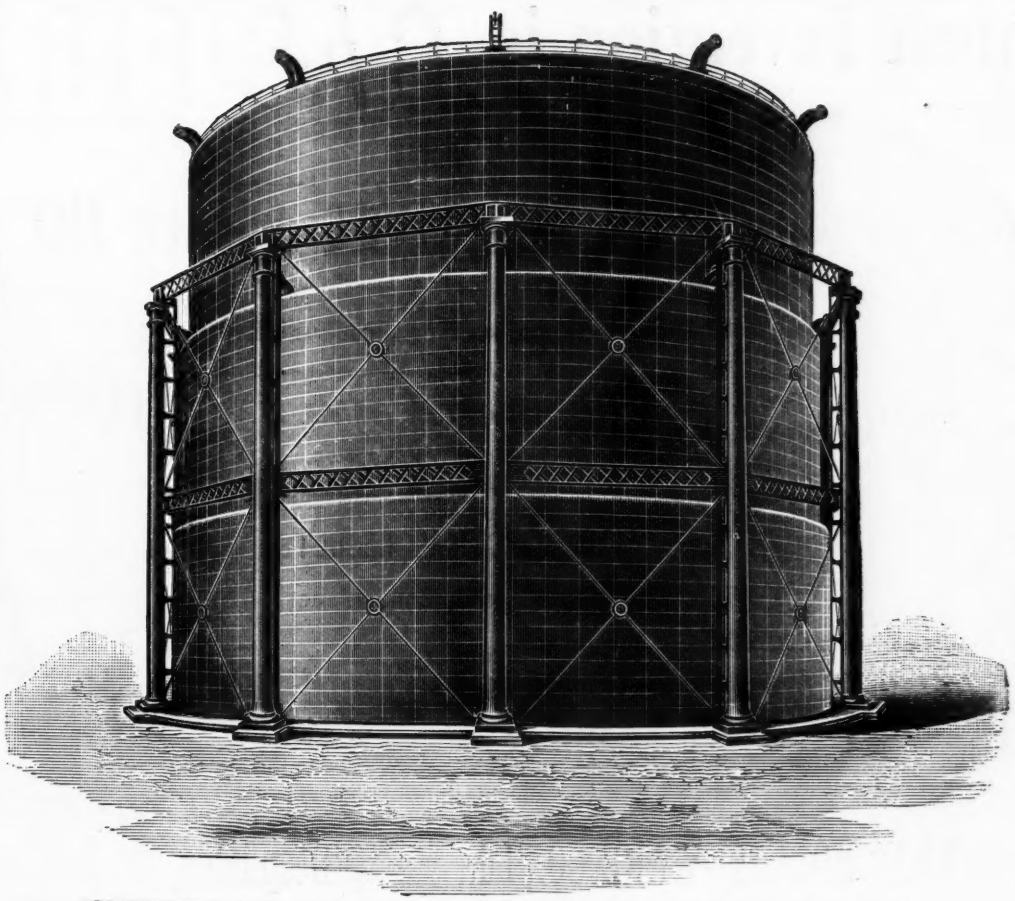

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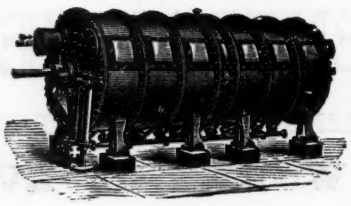

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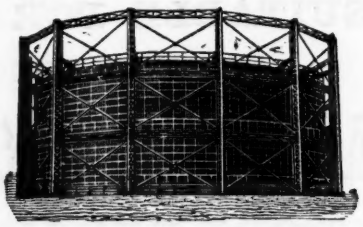

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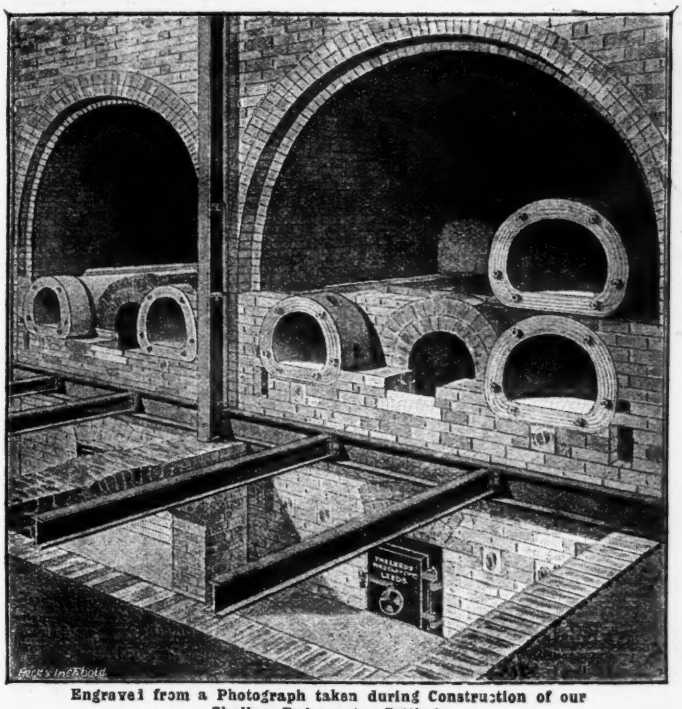

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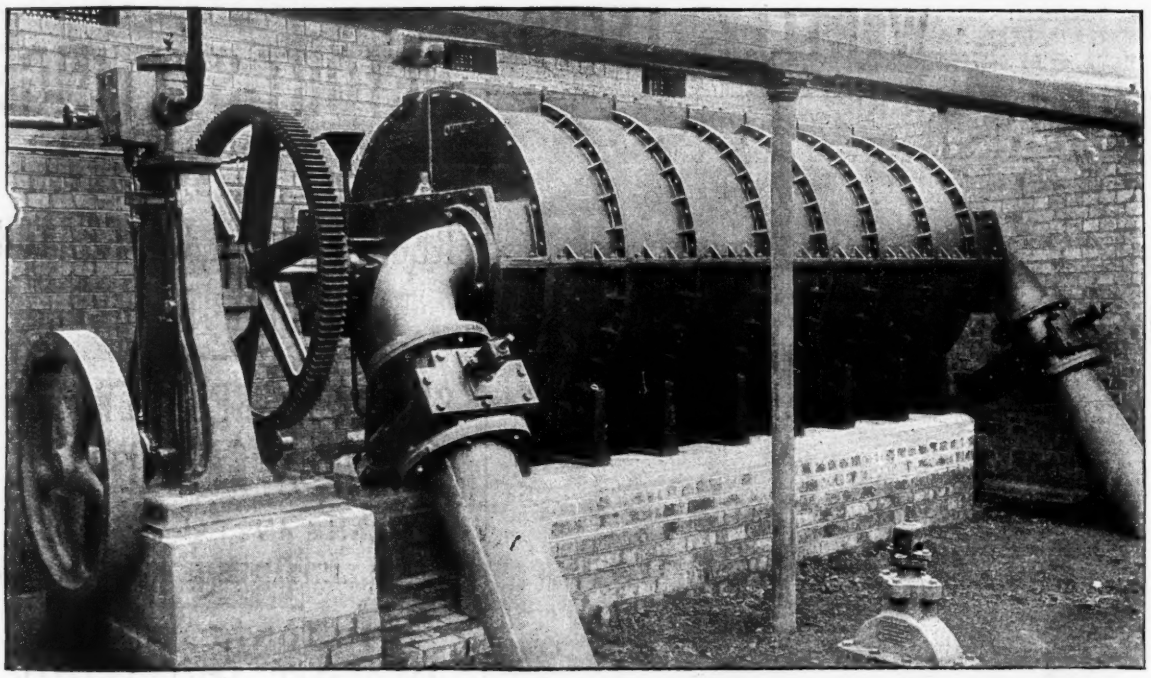

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Manchester	3,000,000
Brighton	1,750,000
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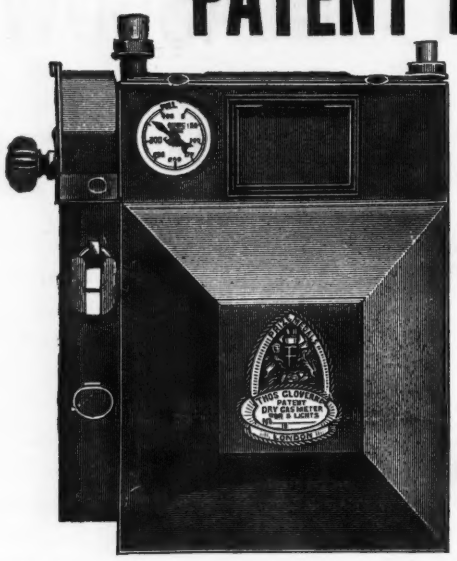

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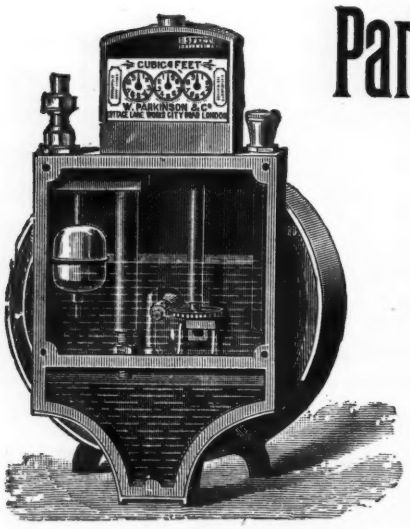

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

EDITORIAL NOTES.

The Non-Abatement of Smoke in London.

THE consequential teaching and effects of the Welsh coal strike are numerous and often surprising. One of the most impressive of these lessons was the disclosure that very much of the supposed advance of smoke abatement in connection with steam raising in the Metropolitan district, which had been ascribed to the use of improved mechanical devices, was illusory. It is quite true that London factories made less smoke than, for instance, Manchester or Sheffield factories; but this was only because the former burnt smokeless Welsh coal. The moment the supply of this clean fuel was interrupted, London factories became as smoky as similar establishments anywhere. Particularly was this the case with electric lighting central stations. The water-tube boiler is largely used in these electrical factories; and this is a steam generator which is desperately given to smoking, when it has the smallest opportunity. Consequently, complaints have been heard that the vaunted cleanliness of the electric light is greatly discounted by the dirtiness of the generating station, with its tall chimney poisoning the atmosphere over a wide area. It has been the same with the steam-vessels plying on the River Thames above bridge. A resident of the Temple complains that "for six months and more this intolerable nuisance has "been going on." Factory and steamship owners have been prosecuted upon all sides; but the majority of them have elected to pay the fine rather than alter their furnaces. Perhaps they are wise in their generation. Now that the Welsh coal is in the market again, the complaints of smoky factory chimneys will die away.

Meanwhile it is worth notice that public opinion has given up belief in electric lighting as a guarantee of the cleanliness of a town atmosphere, where the factories do not burn a smokeless coal. A curious commentary upon this state of things has appeared in the "Hospital." The writer has drawn attention to the connection between a smoky atmosphere and window-cleaning accidents. He observes that in London the windows require cleaning at least three times as often as would be necessary if the atmosphere were not so highly charged with smoke; so that "a very "considerable proportion of deaths from window-cleaning "must be put down to the account of the smoke fiend." He does not see any remedy for this deplorable concomitant of the smoke nuisance—"unless, indeed, the Gas Companies "will kindly let us have gas at such a price that it shall be "cheaper to use than coal." As a matter of fact, this is actually the case in respect of many thousands of the fires that business London needs during the daytime. It has been pointed out in the "JOURNAL" every autumn for some years past that gas-fires are not only much more convenient, but are as a matter of fact cheaper than coal-fires for offices and those commercial establishments which are not provided with steam or hot-water heating plant. Taking sixpence a day as the minimum charge for a coal-fire, or for a scuttle of coal—as the case may be—it can be easily shown that less than sixpennyworth of gas burnt in a properly-fitted "fire" serves the same purpose with greater convenience, inasmuch as it does not require attention. A gas-fire is the very thing for a City office. It is cleanly, always available, and can be dispensed with at any moment. All the undeniable recommendations of a cheery, fitful coal-fire for domestic use are beside the mark in the case of a business establishment. The business or professional man has something else to do besides poke the fire; nor does he want to sit beside his hearth and gaze at the faces he can see in the hollows of the glowing coals. He merely wants a warm room, and no trouble in keeping it so.

This being the case, whose duty is it to wait upon the City man during the summer or early autumn and recommend gas-fires? Does anybody take the smallest trouble to push this line of business? Here, as usual, the gas company are out of it. The electric lighting company call and try to book an order—nobody takes the trouble to look up the gas-fittings, and see that they are likely to give continued satisfaction. The fires? Oh! they are the house steward's or the housekeeper's business. City men have other things than office fires to occupy their thoughts until the first cold raw morning comes; and then they choke themselves with the smoke of kindling wood and coal purchased at the rate of sixpence the scuttle—and a tiny scuttle at that. It is a common experience of those who have occasionally to work late in the City, to go on the prowl round the office rooms

in search of a few knobs of coal to keep one fire alight withal. The City man pays about £5 a ton for his coal, under this system. Decidedly, gas is cheaper; but the pity of it is the truth is not generally known.

The Gas Supply of Vienna.

THE remarkable experiences of the Imperial Continental Gas Association in respect of their Vienna property have been mentioned several times in these columns. We have been compelled to tell the story of the conflict between the Association and Dr. Lueger, the Burgomaster of Vienna, as it has been unfolded by ordinary newspaper reports; because, of course, the Association could not supply any official information concerning their proceedings for the protection of their property other than is contained in the reports of the Directors. This has been no disadvantage to anybody, seeing that the proprietors and friends of the Association have perfect confidence in the Administration. It may also be observed that English spectators of the development of the Vienna Gas Question have been loth to believe that Dr. Lueger, whatever his opinions and his position, would be able to outrage the laws of property, assuming Austria to be a civilized State. Dr. Lueger has been engaged in his campaign against the Association for the last two years; and the result up to the present was recounted in last week's "JOURNAL." To-day the story is rounded off by what we are able to reproduce in another column of a communication from the Vienna Correspondent of "The Times." Dr. Lueger has failed to carry out his boast of driving the English out of Vienna, and, instead, has been digging the grave of his own Administration in the superfluous trenches for the municipal gas-mains which have disfigured the city. The Municipality might have obtained the whole of the undertaking of the Association for £1,350,000; whereas now the new so-called competing works will cost more than £3,000,000, and even so will only be able to serve a portion of the city. The Municipality have even been constrained to interfere in order to prevent the Association from lowering the price of gas during the remainder of the period of their concession. It is a most remarkable instance of mismanagement of municipal interests for the sake of a political cry. Truly, the Empire of Austria has many vicissitudes to endure by reason of the factions raging among its heterogeneous population; but for downright superfluity of mischief and waste of money, this Vienna gas business cannot be paralleled in history. There is little satisfaction in congratulating the Association upon their victory over Dr. Lueger. It has been too bad a business throughout to leave any pleasant impression behind; albeit one must be glad that the cause of justice and law prevail against the forces of passion and prejudice. It is the people of Vienna who have to suffer for it all; and they can ill afford it.

An Old Rule of Law Overlooked.

A FINE old crusted legal maxim tells us *de minimis non curat lex;* but the world seems to be changing its views of what constitutes the littleness that is exempt from legal cognizance. There is a Departmental Committee of the Home Office charged with the serious duty of investigating and reporting upon dangerous trades. Most people would agree that it is highly desirable for periodical inquiries to be held into the methods of industry and trade, in order to make sure that commercial enterprise, goaded by competition, does not transgress the laws of sanitation and outrage the rules of public security. Accordingly, the objects of the Home Office Committee are most likely to commend themselves to public support, so long as they are sought with due regard for proportion as well as the essential character of their subject-matter. The Committee are addicted to issuing interim reports, which is a very praiseworthy means of reminding the world of their existence. Last year they created a small sensation among the interests concerned by listing the generation of electricity at central stations among the "dangerous trades;" but this year they have no similar surprise to disclose. Instead, they place upon record the fact of their attention having been drawn to "sole-stitching by American machinery," which does not at the first glance suggest anything dangerous. It seems, however, that representations were addressed to the Committee "that the heat from the gas-jet causes vaporiza-"tion of the mercury, and that the inhalation of this vapour "is injurious to the health of the operators." Accordingly, the Committee visited boot and shoe factories in London, Leicester, Manchester and Salford, and in Scotland, and took a considerable amount of evidence upon the subject. They admit having received complaints of "disagreeable "results from the escape of coal gas, most commonly "caused by an insufficient supply of mercury in the "socket. The evidence as to mercurial poisoning was "limited to two cases, and was not conclusive." As a matter of fact, these were both old cases; and fellow-workmen were of opinion that in one instance the death was due to consumption, and in the other to drinking. What one would like to know is who laid the information concerning these cases before the Committee, and thus caused all the waste of time, trouble, and expense. This does not appear; but it would probably be near the mark to look to the Shoemakers' Trade Union for the instigating cause of this very ridiculous inquiry. It is just like Trade Union cunning to raise a ghost of this sort, after having failed to keep out the machine by the crude device of not working it to its full capacity. Mercurial poisoning through the evaporation of the mercury seal of a gas connection forming part of a sole-stitching machine! It is a Trade Union idea all over; but the Home Office Committee must have forgotten the old maxim when they started a long and serious inquiry upon so slender a suggestion.

A Bricklayers' Protest.

WHEN commenting in this column last week upon the brooding trouble in the building trades, we remarked that nothing short of the remedy applied to the engineering trade will be found competent to cure the evil of Trade Union domination. Something that has transpired in London during the past week may be taken as indicating that it is high time the remedy in question was exhibited. The Vestry of St. Mary, Newington, are having an electric lighting station built in the district of Walworth; and upon it a gang of 31 bricklayers were employed. They were all Society men; but one of the number, named James Bushell—all honour to him!—was too quick in getting up his quoin for the rest, who are described in a newspaper report by the expressive title of the "Wait-a-"Bits." Accordingly, 26 of the noble crowd informed the foreman that Bushell must be discharged, or they would all lay down their trowels and take their money. The modest demand was rejected, in terms which are not reported; and the men's threat was duly carried into effect. Bushell was sublimely unconscious of having committed what, in the guarded language of diplomacy, might be called "an unfriendly act." He did not hurt himself, and, indeed, has declared that he "wasn't working over hard—"in fact, he could have done much more, and considered "he had one of the easiest jobs he was ever on." Yet the great majority were unable to keep up with him; and so, by the doctrine of the "greatest good for the greatest "number," this pestilent fellow ought to have been suppressed. If he had been working for the London County Council, an Alderman would have warned him that "some-"thing might happen" if he persisted in manifesting such inconsiderate energy. In the engineering shops under the A.S.E., such a man would have been liable to have something dropped on him from the travelling crane; or a red-hot iron would have accidentally come in contact with his leg. The resources of the "Wait-a-Bits" are many and various. The good bricklayer James Bushell may still have cause to rue his independence of the law of the "Union stroke," unless the employers in the building trades make up their minds that such men as he are to be protected, though they were but as one against hundreds. Matters cannot go on for ever in the groove revealed in this example; the employers must deliver themselves from the tyranny of the Union. Certainly nobody can do it for them.

British Trade Methods.

NOTICE has been taken by the newspapers during the past week of a remarkable Blue Book just issued, which preserves in a collected and orderly form the opinions lately expressed by Government Agents abroad upon British trade methods. From time to time, as is well known, Her Majesty's Diplomatic and Consular Agents in foreign parts take the trouble to send home their views regarding the state of British trade competition with the rival traders of other countries. Scattered as they naturally are through a variety of official statements, these observations are very liable to lose their proper value; and it is a great advantage to have them brought together for reference. The first impression produced by this useful compilation is that British goods are undersold in many instances by

the simple expedient of sacrificing quality to cheapness. Those who are in the gas-fittings trade, for example, know that this is so all over the continent of Europe; and that the German manufacturers can, and do, turn out a class of cheap and showy articles which English makers would certainly decline to make at any price. At the same time, the question is pertinently asked whether English firms are not too rigid in such matters. "Complaints have been "made by German business men who carry on a large "and regular trade with England, of the lack of willing-"ness on the part of English manufacturers to meet "their wishes." The Englishman considers he knows what is best for the purpose; and he is probably right nine times in ten. But it is nevertheless irritating for the would-be purchaser to be told that he cannot have the commodity he wants. It is the same in retail trade. Who does not know the annoyance of being told by a pert shopman that something he has to sell is much to be preferred to the article asked for, but which does not happen to be in stock? Complaints are also made that the British manufacturer is blind to the merits of the metric system of weights and measures; but this is a large and debatable question. It is much more to the purpose to hear that the tendency of the British workman to indulge in strikes is driving away orders from British manufacturers. Not that strikes are unknown in foreign countries, but it is contended that they more rarely go to the length of interfering very seriously with trade. This also is a questionable matter. Still, the Blue Book supplies numerous instances of orders for machinery having gone abroad owing to the engineers' strike; and a trade connection once lost and gained in this way is not easily altered afterwards. Plenty of evidence is also given to demonstrate the necessity for personal representation in trade. It is the commercial traveller, not the catalogue—the agent, not the circular—who gets the trade. The English manufacturer is accused of being committed to the system of "take it or leave it." This attitude answered well enough once; but it has become obsolete. It seems incredible that English makers should send to Spain catalogues of gas-engines with the cost of working stated in "pence per horse power." Yet this stupidity is reported by the Consul at Barcelona.

The New Judicial Procedure in Criminal Cases.

Large employers of labour and owners of industrial property are accustomed to suffer heavily in the aggregate from incessant small pilferings of stores and tools. The evil is not worse in gas-works than in the case of other factories; but still a good deal of it goes on, particularly at such times as outside contractors' workmen have the run of the place. The trouble of prosecuting, and the difficulty of securing convictions, deter works' managers from taking legal steps in many instances when the cause of justice would be served by their doing so. It has notoriously been difficult to make out a clear case against several men charged with conspiring to commit a petty larceny; and as most works robberies require the collusive action of two or more thieves, they often go unpunished. It is worthy of notice that the new system of procedure in criminal cases came into operation last week. Under this new rule, an accused person is permitted to give sworn evidence in his own defence. When several persons are charged together, any or all of them may offer their own testimony, which may be the subject of cross-examination. Although the new law has only been in force for a few days, reason has already emerged for the belief that it will work very beneficially for the cause of justice in prosecutions of the kind now in question—charges against several defendants for petty pilferings in industrial establishments. Under the old system, practically all the delinquents who really knew the facts of the case were shut up in the dock together, and their mouths were closed. In that position, they could enjoy the flounderings of the witnesses, who were only able to tell a small part of the tale, and were consequently often made to look foolish by the cross-examining counsel. Now the temptation for every one of the accused to try and save himself, regardless of the others, will usually prove irresistible; and where there is actual guilt, it will be made manifest in quick time. A writer in the "Daily News," after spending a day in the Central Criminal Court, came away with two very strong primary impressions respecting the operation of the new system. "One is that it will probably prove very good "for justice. The other is that it may be very bad for the "prisoner whose partner in mischief elects to go into the "box." This is precisely the point; and it is well brought out by an account of the trial of two men, who stood in the relation of master and man, on a charge of felony committed at a wharf. It was a plumber and his labourer, who had been employed by a firm of wharfingers to repair a roof and put wire netting (supplied by the firm) over some skylights. When the job was over, and the men had packed their handcart with all their paraphernalia, the foreman of the wharf came up and had the contents of the cart turned out. It was found to contain a sack with about 25 feet of wire netting, and some Chinese tea-sticks that had been abstracted from a cargo stored on the premises—both wire and sticks being the wharfingers' property. Under the old procedure, it would have been extremely difficult to convict these men of the theft. The master declared he had merely put the surplus piece of wire netting in the bag for convenience in getting it along the roof, and had no intention of taking it away. The labourer had packed it into the cart without orders. For his part, the labourer's case was that he thought the wire belonged to his master. Both tales were conceivably true; and a Jury might have hesitated to reject them. But then there was the matter of the tea-sticks to explain; and the upshot was that both men elected to give evidence, and they managed to convict one another of guilty knowledge of the whole business. "The "net result of the two appearances in the witness-box was "to create a very strong impression that both men knew "very well that each was taking what did not belong to "him." This is what may be expected to happen in a good many similar cases; so that those who hold that the law should be a terror to evil-doers may congratulate themselves on the new reform in judicial procedure.

WATER AND SANITARY AFFAIRS.

The County Council has decided that the recent restriction of the East London water supply to four or six hours per day affords a sufficient reason for "forthwith" launching a plan which shall revolutionize the entire water supply of the Metropolis. What the plan is to be we are to learn from the Water Committee, whose propositions, however, make no appearance in the Council's *agenda* for to-day. In the debate last Tuesday, Mr. Dickinson, as Chairman of the Water Committee, acknowledged that it was "a strong "action on the part of the Council to ask Parliament for "legislation while the Royal Commission was yet sitting." As a good justification for this extreme course, it was urged that "the claims of East London" were so paramount that Parliament ought not to be without a definite scheme to deal with the matter. But if the Water Committee propose, as everybody seems to expect, that a supply shall be brought from Wales, the claims of East London will have to stand over for several years to come. Mr. Beachcroft's amendment, which was adopted along with the original motion, though really unnecessary, considering that the Companies are already fulfilling what it contemplates, was far more likely to benefit East London than the scheme of a Welsh supply. Yet it certainly seems a little out of place for the Council to ask their Engineer what works, in his opinion, are required to provide for connecting the mains and works of the several Companies for use in cases of emergency. The Engineers of the Companies are quite likely to have an "opinion" of their own on this subject, founded on an intimate and practical acquaintance with the facts. But the proposal need do no harm; and it rather directs attention to the most reasonable way of meeting the exigencies of the case. Those exigencies are now substantially provided for; and if a restricted supply in East London is to furnish the reason for an application to Parliament, this ground of action may soon slip from under the feet of those who make it their starting-point.

It has been said that on this water question there is at last something like an approach to unanimity in the County Council. We shall see what this unanimity amounts to by the time the report of the Water Committee appears. It is intimated that the projected supply is to be of a supplementary character. Is this to be sent on in bulk to the Water Companies, or is there to be a supplementary system of distribution? The latter arrangement must of necessity involve competition, and it is certain this will not be sanctioned. Hence the "Chronicle" says that the scheme of a supplementary supply from Wales will be "probably

"accompanied by the purchase of the present undertakings." But "purchase" is a big affair; and we can hardly expect that the Water Committee have an explicit plan for dealing with it. Connected with the main question in all its bearings there is the complicated subject of the outer areas. The authorities of these outlying parts will have a voice in the matter, though the Council will doubtless repeat its former policy of satisfying these authorities at the cost of the London ratepayers. Again, if purchase takes place, to whom shall the undertakings be entrusted? We find it suggested that a revival of the Water Board scheme would smooth the way for a transfer of the supply. If there is to be a change, it seems inevitable that there should be an authority to comprehend the whole of "Water London." But this idea is not popular at Spring Gardens. To fight the Companies, with the chance of seeing the spoils of victory, if ever accomplished, pass into other hands, is not the sort of campaign to suit the Progressive idea.

On the benefits likely to accrue from an amalgamation of the Metropolitan Water Companies, we publish this week a letter from Mr. C. E. Jones, who, as having been until lately, and for many years, Engineer and Manager of the Chesterfield Water and Gas Company, is able to speak with some authority on the subject. The engineering and financial advantages of such an amalgamation are concisely pointed out, together with the administrative facilities that would be secured, and the greater degree of resistance that could be offered to the attack of the agitator. That the interests of the London Water Companies, as well as those of the consumers, would be promoted by an amalgamation of the undertakings, could it be accomplished, is a view which we have presented to our readers on several occasions. A combination of supplies would seem to point very distinctly in the same direction; and there is something significant in the efforts of the County Council to place the action resulting from such combination under restraint through the intervention of the Local Government Board. The Companies may link up their mains, but the water must only flow as permitted by the Board; and the Board may only give permission when there is an "emergency." Mr. Jones includes in his letter some useful statistics on what he properly terms the recent "rain-famine" in the Midland and Eastern Counties. We commend the phrase to the notice of the "Chronicle." Happily there are signs that this "famine" is now drawing to a close. How severe the drought has been is shown by the September report of Sir W. Crookes and Professor Dewar, by which it appears that from the 1st of January this year the deficiency in the rainfall in the Thames Valley amounted to more than 44 per cent. The observations of Mr. Jones in regard to the Lea Valley show a record of 50 per cent. below the average.

Mr. H. S. Samuel, the member of Parliament for the Limehouse Division, who gave the Government warning the other day that if they did not bring in a Bill to reduce the charge for water in East London in proportion as the supply was restricted someone else would, has prepared a Bill of another kind for the coming session. This projected measure provides that the Metropolitan Water Companies, "each and all of them," shall forthwith connect their several mains. The Companies are at the same time to be enabled to enter into agreements for the intersale of water; but there is inserted a proviso, after the manner of the County Council, that a supply from one Company to another shall only take place with the consent of the Local Government Board, and during such period as the Board may prescribe. All the rights of the Thames Conservators are reserved, including the limitation of the water to be taken from the river. Then there comes a repeal of the 35th section of the Metropolis Water Act, 1871, in order to provide that the Local Government Board shall be able to appoint a "competent person" to inquire and report, not only as to the quality of the water furnished by any of the Companies, but also as to the quantity in the reservoirs and the pressure in the mains. The Local Government Board are to have power, in cases of emergency, to compel the Companies to assist each other by a supply through the junctions. If the Companies fail to comply with any of the provisions of the Act, they are to be liable to heavy penalties; and every penalty is to take effect in reduction of dividend. We can only say of the proposed Act that it is either superfluous as requiring the Companies to do what they are already doing, or it is absurd and tyrannical as interfering with matters which properly come under their control, and for which they alone must be held responsible. It seems to be inferred that the Companies do not understand their own business, and that somebody must manage it for them. But, of course, Mr. Samuel, as having an East London constituency, must make a show of doing something; and this is the result. We almost wonder he did not go a step further in framing his Bill, and empower the competent person to inquire into the pressure in the steam-boilers of the pumping-engines. The Bill is professedly designed "to make provision for the due supply of water to the "Metropolis." But care is taken to preserve the limits of the supply which may be taken from the Thames. More water is to go into London; but no more is to come out of the river. It is a little odd that, while the Thames is thus carefully guarded, nothing is said about the Lea and its Conservators.

A correspondent of the "Zeitschrift für das Gas und Wasserfach" deals out the most unmeasured abuse to the East London Water Company for their failure to give a continuous supply of water during the recent drought. He instances their conduct as a typical example of the evils of the English system of granting monopolies to gas, water, and telephone companies. The irony of his remarks—which bear a striking resemblance to the outpourings of certain Progressive English organs—is discounted, however, by his concluding sentence, which doubtless crept in from some less inspired source. From it we learn that the water supplies at Dresden, Frankfort-on-the-Main, and other German towns, also proved inadequate during the hot weather. The evils of the English system of monopolies are thus substantiated!

Sugar Synthesized from the Constituents of Water Gas.—A short time since M. Slosse reported to the Belgian Association of Chemists that he had prepared sugar, by exposing to the dark electrical discharge in a Berthelot ozonizer a mixture of carbonic oxide with twice its volume of hydrogen. The sugar formed answered to all the customary tests for cane sugar. It was necessary that the gases should be dry and perfectly pure. The discovery does not appear to have any immediate practical value.

The Secretaryship of the Sheppy Gas Company.—We understand that, in response to the advertisement in the "JOURNAL" for the 4th inst. inviting applications for the secretaryship of the Sheppy Gas Company, the Directors received communications from 86 candidates. Most of these were found suitable for the office; and consequently the task of the Directors has been a difficult one. They have, however, selected three of the candidates for an interview; so that very possibly we shall be in a position to announce the name of the successful one in our next issue.

The Humphreys and Glasgow Carburetted Water-Gas Plant.—It cannot be said of Messrs. Humphreys and Glasgow that they have failed to keep the members of the gas profession informed on the subject of the special system of gas manufacture with which they are identified. Publications already issued by the firm have dealt generally with the efficient and economical production of carburetted water gas; and they have just added to the list a book of illustrations (No. 8) of a number of typical installations of plant, accompanied by descriptive matter, plans and diagrams, and testimonials from engineers as to its working. The book furnishes just the information a manager requires who is contemplating the introduction of the new system into the works under his supervision. The illustrations and text, which occupy 150 oblong pages, are exceedingly well printed on highly-finished plate paper; and the book is gilt-edged and lettered, and handsomely got-up generally.

Blast-Furnace Gas for Gas-Engines.—Writing on this subject in the current number of "Cassier's Magazine," Mr. H. Savage says: "Each ton of pig iron run from the hearth of a blast-furnace is accompanied by the evolution from the furnace top of from 150,000 to 180,000 cubic feet of combustible gas. It was long disputed that this gas, the combustion of which in an ordinary boiler flue was sometimes a matter of difficulty, possessed sufficient heat-producing capabilities to allow of its use as a motive agent. Another insuperable objection to the employment of blast-furnace gas in the cylinder of a motor engine was supposed to lie in the difficulty of ridding it sufficiently of dust. Both these objections have, however, been set at rest. We thus have in every large modern iron-works an almost unlimited source of power, the means of utilizing which have been placed at our disposal, thanks to the progress accomplished in the construction of gas-engines of large size and efficient type. The final result is nothing short of an industrial revolution. The gas-fired boiler, the recognized mainstay of all iron mills or smelting works, is in this way threatened with extinction."

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 877.)

THE Stock Exchange had a very dull time last week. A tone of alarm was set at the opening by the publication of the Fashoda papers which had a depressing influence; but it soon became considerably less acute. However, it put a stop to enterprise; and business fell very quiet. The settlement, also, had something to do with checking fresh business. The general tone was improving about mid-week; and Consols were rising when the advance in the Bank-rate came and upset calculations. Thenceforward extreme quiet and weak markets were the rule; but the worst was over before the close of the week. The Money Market was strong with a good demand. The rise in the Bank-rate, from 3 per cent. (fixed on Sept. 22) to 4 per cent., was a complete surprise at the time; but the Directors have so often found a ½ per cent. advance ineffectual to stop a run, that its wisdom is pretty well recognized now. Business in the Gas Market was not up to the level of the preceding week, but relapsed into quietness in common with the rest of the markets. Movements were few and irregular; and though the advances outnumber the recessions, yet it was the leading issue that receded. Gaslight "A" was very moderately dealt in daily at about 293 or 294; but failing to improve the quotation at the close, was put down a couple of points, though actual prices marked did not alter. Business was light in the secured issues; but all the 10 per cents gained a point. South Metropolitan changed hands moderately every day at steady figures. In Commercials, only the debenture was touched; stock being scarce. The Suburban and Provincial group would have been quite stagnant but for a few dealings in Brighton original, which advanced a point. The Continental Companies were steady and unchanged; some extent of profit-taking having checked the advance in Imperial. None of the rest presented any remarkable feature; but Buenos Ayres continued in favour. The Water Companies were almost quieter than ever; and the only changes were those arising from *ex div.* quotation.

The daily operations do not require a detailed notice; being at one dead-level and at unvarying figures until the closing day of the week. The only change, except those arising from *ex div.* quotation, was an advance of ¼ in Buenos Ayres. But Saturday was the most conspicuous day, for Gaslight "A" fell 2; and ditto "C, D, and E," and "J" rose 1 each; and Brighton and Hove original, 1. There were no changes in Water.

ELECTRIC LIGHTING MEMORANDA.

The Persistent Unreliability of the Electric Light—Mishaps in Sunderland and Norwich—The Splendid Example in Municipalization of Edinburgh and Glasgow.

FROM time to time the electric light provides irritating reminders that the unreliability which has always characterized it remains an incurable weakness of the system. Like epilepsy in the human subject, this liability of the electric light to "go out" without warning, at inconvenient moments, persists from youth to middle age, and is completely destructive of confidence in its serviceability. Nor is there the smallest prospect of the system outliving this detrimental character. Only the other day, while Alderman Lennard, the Chairman of the Leicester Corporation Electricity Supply Committee, was engaged in moving at a Town Council meeting the adoption of the report of the Committee, the electric lighting of the Council Chamber took the opportunity of going out and leaving its official apologist to deal as best he could in the dark with the irony of the situation. Last Friday week, in the City of London, the electric light, supplied by the City Company, failed between 6 and 6.30 p.m. over a considerable part of the district. Of course, this was just when the light was most wanted. The explanation of the occurrence offered by an electrical contemporary is worth giving. It might serve as the text for an examination paper in electrical engineering. "For the Western district there are eight Mordey alternators, with Ferranti coils, six of which machines were running at the time of the accident. At a few minutes after six, a coil on each of two of these machines burnt out; and the machines were immediately switched off from the 'bus bars. The remaining four machines were not, however, sufficient to cope with the load, slowed down, and got out of phase. It was thereupon necessary to switch off the machines and the sub-stations, synchronize the former anew, with a fifth machine added, and connect on the sub-stations again, one after another, as the successive machines were paralleled." Now the student knows all about it.

At Sunderland the indifference of electricity supply to considerations of "system," when it is a question of lights going out, was illustrated on Sunday week. In the City of London it was the alternating-current plant that broke down; in Sunderland, where both systems of supply are in use, it was the continuous current that went wrong at an awkward time. A large concentric cable suddenly developed a fault at 6.10 p.m., just as the places of public worship were lighting up for evening service. When the mischief was first of all perceived, it was attempted to "clear the fault"—whatever this may mean—by "burning out;" but the only result of this heroic operation was to "extend the burn-out over a length of 50 yards." No previous indication of the existence of a short circuit had been observed, "the station ammeter having remained at zero during the whole of the afternoon until the breakdown occurred." At Norwich also, on the evening of Friday, the 7th inst., a short-circuit took place between the positive and neutral mains, which pulled up the machinery and necessitated shutting down for a few hours until the fault was located and cut out. It was due to the bare strips of copper composing the mains having buckled and thus come together. Matters were all right again by midnight. Of course, all these mischances can be explained, and their recurrences from the same cause, or in the same way, guarded against. Unhappily when a man is an epileptic, there is always the haunting fear of his falling into the fire, which is against his prospects of succeeding as a public or domestic servant.

The example of the municipal electric lighting of Edinburgh may be cited as one of the strongest refutations yet offered of the puerile contention sometimes advanced in the electrical press that municipalities owning gas undertakings are apt to starve electricity supply, through fear of it. The Edinburgh Corporation began to supply electricity for lighting and power purposes in 1895—about the same time, practically, as they came into possession of the city gas undertakings. They have laid out nearly £300,000 upon the electricity works and plant; and are supplying current for private lighting at 3½d. per unit. subject to discounts up to 25 per cent. They are doing the street arc lighting at £14 per lamp per annum; and for the first time in its history, Edinburgh has, in places, public lighting which does more than render its darkness visible. Last year the Committee made a working profit of £20,648; and after providing for interest and redemptions of loans, they put aside £4000 for depreciation—being 1·54 per cent. on the capital expended. This is not much; but it is a piece of financial virtue such as few municipal authorities engaged in the business display. After this, the Committee had £3024 to give in aid of the city rates. Doubtless, the Committee wished to have this proof of financial prosperity to offer to the ratepayers; and inasmuch as the Corporation forthwith reduced the price of current, the bonus is not likely to be repeated. In truth, Edinburgh does not want it. Scottish municipalities recognize the truth that cheapness and efficiency of all public services that can fitly be municipalized is infinitely more desirable than a fictitious profit, such as anybody can make who has a monopoly. Thus a Scottish city corporation would sooner provide its citizens with a halfpenny tramway service than charge a penny and show a "profit." So it is with electric lighting and gas. Here is the Edinburgh Corporation cutting down the price of electricity to the lowest margin, while actually contemplating a vast outlay upon new gas-works. Glasgow is in the same case. Now, if ever, it might be imagined that both Edinburgh and Glasgow would like to feel sure of the stability of their gas property, and would be exposed to the temptation of putting gas forward at the expense of electricity. The public spirit of these cities is, however, above all such petty considerations. The Municipalities know full well that the people are not likely to need less gas because they can get cheap electricity if they prefer it. Both services are necessary and desirable for the districts supplied; and each can take care of itself, provided it is allowed fair play and full scope. It is a wonderful thing that so few English Municipalities, comparatively, see the matter in this light. Their Committees want to make "profits," forsooth! By all means let gas and electricity supply be carried on at a "profit;" but the profit should be in the shape of the best and cheapest possible service for the community as a whole, not a dole to be spent by a Corporation Committee ashamed to depend for support upon the rate fund.

The Somzee-Greyson Intensified Gas Light.—An installation of this light has been made for illuminating the entrance to the London Pavilion Music Hall. It is surrounded by a number of electric lights; so that it is in a good position for making a comparison between the two illuminants. It is an effective illustration of what can be done by gas when it is given fair play. The quantity of gas consumed by the twelve burners fixed is 120 cubic feet per hour; giving a light of 3600 candles.

The Manufacture of Carbide in the Blast-Furnace.—Numerous attempts have recently been made to produce calcium carbide without the aid of the electric furnace. In a blast-furnace supplied with ordinary atmospheric air, a sufficiently high temperature for carbide manufacture cannot be attained; but air richer in oxygen has lately been used successfully. Such air can be readily obtained by the help of the Linde machines for the liquefaction of air. The more readily volatile nitrogen can be, to a large extent, separated from the more easily condensable oxygen by the simple working of these machines; and a mixture of 50 per cent. of oxygen and 50 per cent. of nitrogen can be produced without any difficulty from the atmospheric air. Such a mixture, which is becoming known as "Linde air," suffices to give a sufficiently high temperature to produce carbide when used as a blast in a furnace fed with lime and carbon. The Linde air promises to have many other uses in the manufactures, and may perhaps be of value for the revivification of oxide and Weldon Mud *in situ* in gas purifiers.

ENGINEERS AND CONTRACTORS—THE QUESTION OF SPECIFICATIONS.

The old alarmist cry "The country's in danger!" with which our grandfathers were so painfully familiar, has in these later days undergone variation. It now strikes the ear in the form "British trade supremacy is in danger!" and whenever newspapers have nothing else to discuss, they raise this cry, and usually end it with a commendation of "technical education" as a preventive measure. Students of history know that one British Administration, in order to pacify the alarmists of the period, expended vast sums upon the construction of useless Martello towers along the South-Eastern coast line, and supplemented the Straits of Dover by a so-called military ditch. History, as we know, has a knack of repeating itself; and unless certain first principles are steadily kept in view, the panacea of "technical education" will prove with respect to British trade what the Martello towers and the military ditch were to the fighting England of Pitt and Wellington. This reflection is suggested by two contemporary newspaper readings. The first was a pompous leading article laying down the proposition that the Government are pledged to deal with secondary and technical education, "in which our people are lamentably deficient," and declaring that this pledge had better be redeemed during the ensuing session. The second was a law report referring to the case of a Rotherham steel manufacturing firm, who were fined under the Merchandise Marks Act for using a false trade description. The latter affair is so important that we may well take notice of the circumstances.

Messrs. Steel, Peach, and Tozer, Limited, of Rotherham, were sub-contractors for the supply of steel tyres for railway rolling stock ordered by the Government for Africa and India. The specification for the tyres required that the goods should pass three separate tests—(1) the drop test; (2) the tensile test; and (3) the analytical test. The inspector for the Consulting Engineer in due course marked some tyres for the second test, which involved cutting strips out of the solid steel. When he attended the works for the purpose of seeing the strips packed off for testing, he discovered that those produced were not the same pieces that he had marked. Other pieces of metal had been substituted, and a forged stamp in imitation of his own put upon them. The fact could not be disputed; but when the inspector interviewed the firm on the subject of the substitution, they refused to take steps to discover and disclose the actual perpetrator of the act. The matter was referred to the Consulting Engineer (Sir Alexander Rendel), who in the first place addressed an inquiry to the firm, with a request for an explanation. The reply was that "the irregularity" had so much disturbed the firm's feelings of security in the proceedings of the workmen in the tyre department that, rather than have any more testing of this sample, the firm would prefer to destroy all the material already made and replace it under their own personal supervision. A further reply was sent later in which it was admitted that one of the firm's "contractors, the foreman of the department," had substituted test-pieces for those selected by the inspector "in his desire to get the work through, knowing that the casts put in by him for the particular lot of tyres in question were not quite up" to the specification. After this confession, the firm had nothing else to do but to leave themselves in the Consulting Engineer's hands. He communicated the facts to his clients, and the matter was referred to the Solicitor for the Treasury. Once more the firm were given an opportunity for disclosing the actual offender; but they replied to the effect that the employees implicated had been dismissed, and consequently there was nothing to be gained by giving up the names.

Upon this information, proceedings were taken. The prosecuting counsel pointed out that it is no defence under the Merchandise Marks Act for an employer to say that an illegal act was committed by a servant. For the defence, it was urged, in extenuation, that the tampering with the test-pieces was a trick of a foreman in the position of a sub-contractor. But the defendants pleaded guilty, and were fined £10 on each of three summonses, with 50 guineas costs. The importance of a matter of this kind to every engineer and contractor for metal work needs no magnifying. The considerations attaching to it lie at the very root of the science and practice of civil and mechanical engineering, and affect one of the greatest of the industries of this country. What folly it is to talk of the need for improved technical education for assuring the future of the British iron and steel industry, if all the while what is wanted is common honesty on the part of manufacturers and contractors!

No engineer or man of business would desire to be unduly hard upon the defendant Company in this particular case. Here are a firm, described as of 25 years' standing, with a connection for tyres and axles among all the railways of the kingdom. They have long been doing this class of work, as their Counsel said, "not under extraordinary tests, but where it was desired that a thoroughly suitable article should be supplied." The employees of the firm number 1400; and the work is split up into departments, under foremen and sub-contractors, who are paid so much tonnage on the completed work. There is nothing uncommon in all this. On the contrary, it is the customary way of working in all such establishments. It is very easy for an outsider to point the finger of scorn at a firm who happen to be landed as Messrs. Steel, Peach, and Tozer were on this particular job; but there is nothing to be gained by making a display of cheap ethics at the expense of one firm. What engineers and manufacturers alike have to face is the system, and its dangers, which have just received so impressive a demonstration. For the sake both of engineering and of British industry, the questions arising out of this conviction ought to be gone into from top to bottom.

In the first place, what is the reason for the sub-contracting or piecework system of production in iron-works and engineering shops? Simply to save labour—that is, wages. The firm pay so much tonnage on their steel castings, or their iron castings, or whatever it is; and they should for their part see to it that they get money's worth, in quality as well as quantity. Unfortunately, they have dropped into the habit, in many instances, of leaving this care to their customers; and this is not fair. How many an iron casting has been sent to a job and actually erected, only to be discovered defective at the last moment. Take, for example, a large gasholder contract, with huge cast-iron guide-columns necessarily cast in tapering pieces. In the full swing of erection, everything is brought to a standstill for want of a particular connecting-piece. When it comes, it is found to be flawed—nothing serious, perhaps; but there is putty in a place where iron should be. What is to be done? What should have been done, of course, was to keep a sharper look out upon the foreman at the works.

Hence the trouble about inspection and inspectors. If the firms themselves looked after their own work, the inspectors would only have one party (not necessarily antagonistic) to deal with. As it is, he has two. The unhappy inspector must be on his guard against the tricks of workmen who have been in the trade all their lives; knowing the while that the firm will not thank him if he keeps their work in arrear, though their own men are to blame. The evil has been greatly magnified by the disappearance of the old-fashioned master, who was so in fact as well as in name, and his substitution by joint-stock companies managed by officials whose interest and knowledge are as limited as the responsibility of the shareholders. These concerns depend to a dangerous degree upon their foremen and sub-contractors; and what can the inspector effect in face of so many indifferent or hostile influences? Designers have fallen into the way of thinking that the method to secure sound materials and good workmanship is to stiffen the specifications. Knowing that circumstances conspire to deprive them of the safeguard of the possible contractor's personal reputation for the faithfulness of his work, they strive to make themselves secure by so drafting their specifications that it cannot matter who gets the job. Trust has to be placed upon the inspector for seeing that the requirements are satisfied. Thus the inspector is placed between two fires. It is hardly to be wondered at if the net result is after all disappointing.

The question of strictness in specifying, and rigidity in insisting upon conformity with the terms of a specification, is a very old one as between engineers and contractors. We quite agree with our contemporary the "Engineer" when, in commenting upon the Rotherham case, it remarks: "We have, of course, nothing to say in defence of a most reprehensible fraud; but none the less do we deprecate a system of specifying which tempts people to be dishonest." We cannot, however, follow our contemporary in its strictures upon the specification in this instance. The engineer required the steel to pass three tests—two mechanical, and the third one chemical. Upon this, the "Engineer" remarks: "We hold that it is at once unfair to the steel maker and unwise on the part of an engineer to stipulate not only that steel shall comply with given tests, but also that its chemical constitution shall be defined." Why? Surely, nothing is more common than a requirement that a commodity shall not only *do* certain things, but shall also *be* of a certain composition. Our contemporary pledges its reputation to the declaration that "it is a matter of no importance whatever to the engineer how a steel is made so long as its tensile strength, limit of elasticity, and other physical qualities are satisfactory." We should be very sorry indeed to commit ourselves to any such statement.

On the contrary, we hold that an engineer has every right to know, if he pleases, how the materials of construction he employs are made, and their composition. If he wants open-hearth in preference to Bessemer steel, shall he not have it? And if he has an objection to an excess (from his point of view) of sulphur or phosphorus, or both, may he not forbid it? The responsibility for working to a specification rests entirely upon the contractor who signs the agreement. It is open to him to decline to tender; but it is not open to him, having accepted an obligation with his eyes open, to try and get round it. It is greatly to be deplored that the "Engineer" should vacillate upon this cardinal point. What is true of steel, of course, is true of many other commodities. This is how our contemporary puts it: "So long as [a maker's] steel is just as good as that of other firms who do get out the sulphur and phosphorus, why should it be rejected by the engineer, probably on the ground that it contains nickel, which is excluded by the terms of the specification?" The answer is plain enough. That which the engineer specifies, is what he has a right to have. It is not for the contractor to supply something else, because it is "just as good." Who is to be the judge in this matter? If an engineer

specifies in ignorance, or unreasonably, it is for the would-be contractor to point out the difficulty in advance. To uphold any other rule of conduct in this regard is to favour the competition of unscrupulous contractors who treat specifications as unnecessary evils of their business. As it is, for one contractor who will take the trouble to weigh every word of a specification, and consult with the engineer as to what is really essential to success in carrying out the job, there are ten who will swallow any paper rule with the secret intention of having their own way in the end, even at the cost of "squaring" somebody.

It is not the strict specification that tempts contractors to be dishonest, but the arbitrary use of powers of control which, if actuated on the principle "live and let live," would be quite harmless. Different engineers have different standards of efficiency; and contractors do not all work to the same rule of meritorious performance. Engineers who are in the active pursuit of their profession, if they are worth anything, know more than they can commit to writing in the form of a specification—they know their men. It is the same with contractors. New men are constantly cropping up to dispute the supremacy of the old hands on each side; and soon these make their mark, or drop out of the running. It would be an evil day for British trade and industry, however, if it were once to become understood at home and abroad that a contractor, whether for the supply of steel tyres or anything else, having accepted with open eyes the conditions of his bargain, were to be at liberty to question them afterwards—to say nothing of masking deception by forgery. All the technical education in the world will not avail to save a tradesman who is shaky on the Eighth Commandment.

THE GAS ACTS OF 1898.

(*Continued from p.* 807.)

The City of Waterford Gas Act consolidates the capital of the Company into £56,400 of 5 per cent. stock, with power to raise £24,000 additional capital of the same denomination. By their Act of 1877, the Company were authorized to charge a standard price of 5s. 9d. per 1000 cubic feet of gas, subject to a discount of 15 per cent. for cash in a month. The standard price is now reduced to 4s. 9d., and becomes the initial price under the sliding-scale. The usual proportion of loan capital is authorized, with a limitation to 4 per cent. dividend if converted into capital stock. Sanction is given to the Corporation of Waterford for promoting a Transfer Bill within three years.

The York United Gaslight Company's Act enables the Company, with the consent of three-fourths of the votes of holders of present shares, to convert the existing capital into a general 4 per cent. stock amounting to £350,000, with power to raise £80,000 of additional capital. Payment of back-dividends is limited to the previous six years. The usual proportion of loan capital is sanctioned. All future mortgages, debenture stock, and other securities issued by the Company are to be redeemable at par in not exceeding twenty years. The maximum price of 15½-candle gas (as from Sept. 29) is to be 3s. 6d. per 1000 feet in an area comprised within a radius of two miles from the centre of Ouse Bridge in the city of York, and 4s. beyond. The sum of £12,000, being part of a sum of £33,696 the balance of net profit appearing in the Company's statement of accounts for last year, is to be applied before the end of the year in paying off money borrowed or owing on mortgage by the Company. Proceedings for the recovery of any demand not exceeding £50 may be taken in the County Court.

The Bakewell Gas Act authorizes the Urban District Council of Bakewell, Derbyshire, to supply gas, acquiring for this purpose the undertaking of the Bakewell Gaslight Company, formed in 1848. The capital of the Company consists of £1500, in 300 £5 shares. The existing gas-works are situated upon leasehold land with a term of 58 years from Sept. 29, 1854, held under the Duke of Rutland. An agreement is scheduled whereby the Council purchase of the Duke the site of the gas-works, with everything upon it, at the price of £1200, and also the undertaking of the Company. The district of supply is defined. The price of 15-candle gas is not to exceed 4s. per 1000 cubic feet within the district, or 5s. outside the district and beyond a radius of 1530 yards from the Bakewell Town Hall. Discounts of not exceeding 15 per cent. may be allowed. Three per cent. interest is to be paid on consumers' deposits. The sum of £20,000 may be borrowed for the purchase of the undertaking, and £5000 for the purchase of lands and the removal and reconstruction of the works.

The Drogheda (Corporation) Gas Act authorizes the transfer of the undertaking of the Drogheda Gaslight Company, Limited, to the Corporation. The Company was originally formed in 1839. The share capital consists of £16,190, all issued and paid up; and the Company have no mortgage debt. The gas-works are situated upon leasehold land, which is to be acquired within three years. The maximum price of 15-candle gas is 5s. 6d. per 1000 cubic feet, subject to 10 per cent. discount. Four per cent. interest is payable on consumers' deposits. Gas-rentals are recoverable in like manner as rates, or at the option of the Company as a civil debt. This section does not apply to any sums payable to the Company for fittings supplied and work done in respect thereof. No penalty is to be incurred for defective supply in case of unavoidable cause. The undertaking is sold to the Corporation for the sum of £21,000, with £1250 added for the book debts, cash in hand and at the bank, and coal stocks on Dec. 31, 1897. The reserve fund as it stood on that day and the books remain the property of the Company. In addition to the purchase-money, the Corporation are entitled to borrow £7750 for the purchase of land and the extension of works, and £2000 for parliamentary and other expenses. The borrowing powers of the Corporation under an Act of 1896 are commensurately reduced. The Company are to pay the costs of the Act; but the Corporation pay the costs of their own Parliamentary Agent, Counsel, and Solicitor in connection with the gas-works transfer.

The Filey Water and Gas Act authorizes the Urban District Council of Filey to acquire and carry on the undertaking of the Company, who obtained a Gas Act in 1891. The limits for the supply of gas are the district of the Council. The purchase price of the Company's undivided property is £55,000. The sale took effect on July 1; and from it were excluded "the uncalled capital and all calls and arrears of calls on the shares of the Company being unpaid, all rates due in respect of gas and water, . . . and the Company's reserve fund and all other moneys, securities for money and choses in action then belonging or due to the Company, and the stocks of coal, coke, and other residual products, meters, pipes, fittings, and fire goods in possession of the Company on the same day." The mortgage debt is taken over by the Council. Upon the actual transfer, an account is to be stated between the parties relating to the carrying on of the concern as from July 1 until the transfer; the sum of £293 being taken as the value of the stocks on the stated date. The maximum price of 15-candle gas is 4s. 6d. per 1000 cubic feet, subject to discounts. Four per cent. interest is payable on consumers' deposits. The sum of £10,000 is to be borrowed for the extension and improvement of the undertaking. Surplus profits are to be divided equally between reducing the price of gas and increasing the district fund.

The Market Harborough Urban District Council Gas Act provides for the transfer of the undertaking of the Market Harborough Gas Company, Limited, to the District Council. The Company was originally formed in 1833. The amount of the capital is not stated. The sale is to be by arbitration under the Lands Clauses Acts, as in the case of a sale and purchase by compulsion and not by agreement. The Council are also to pay all costs and incidental expenses, including compensation for officers and servants; it being provided that no officer or servant who has been in the employment of the Company for 25 years or upwards shall lose his right to compensation by reason of his declining to continue in the service of the Council. The purchase-money is to be paid on an agreed day, or, failing agreement, on June 30 or Dec. 31 next after the expiration of two months from the date of the award. The stock of gas, coal, and other tenant's stores at the date of the transfer is to be taken over at a valuation. Fifteen-candle gas is to be supplied at the maximum price of 3s. 6d. per 1000 cubic feet. Discounts are allowable of not exceeding 10 per cent. for prompt payment, and 20 per cent. for large consumption. No penalty is to be incurred for defective supply due to unavoidable cause or accident. The period of error in defective consumers' meters is limited to the last preceding quarter. The sum of £20,000 may be borrowed for extending and improving the works, repayable in forty years.

The Morley Corporation (Gas, &c.) Act empowers the Corporation of the borough of Morley to purchase the undertakings of the Morley Gas Company and the Churwell Gaslight Company. The paid-up capital of the Morley Company consists of £7500 original 10 per cent. stock; £3600 maximum 5 per cent. stock; and £35,000 maximum 7 per cent. stock, with a mortgage debt of £4700. The undertaking is to be compulsorily purchased by arbitration under the Lands Clauses Acts; and it is provided that, in determining the value of the property, due allowance is to be made for the reasonable expense of reinvestment. The Company are entitled to pay the reasonable costs of opposing the present Act, and also of a Bill of their own, out of their cash in hand or the reserve fund. The Corporation are to pay the costs of the winding-up; and the Chairman of the Company is appointed liquidator for the purpose at a remuneration of 50 guineas, to cover all the costs of the liquidation except legal expenses. The Corporation also pay compensation to any officers and servants (other than Directors) in the regular employ of the Company for whom no regular office or employment shall be found by the Corporation. Provided that no officer or servant of the Company who has been in their employ for 14 years or upwards shall lose his right to compensation by reason of declining service with the Corporation. The Churwell undertaking is transferred on payment of an agreed price. The mortgage debt of the Morley Company remains a first charge on the undertaking. The maximum price of 16-candle gas is to be 4s. per 1000 cubic feet. The period of error in defective consumers' meters is limited to the last preceding quarter. Power is given to inspect gas-fittings in new buildings. A loan of £45,000 is sanctioned for gas-works extensions, and £10,000 for working capital; the former repayable in forty years, and the latter in ten years.

The Yeovil Corporation Act contains a part relating to gas supply and the acquisition of the undertaking of the Yeovil Gas and Coke Company, Limited. The Corporation are to serve

on the Company within six months notice of their intention to purchase. In ascertaining the amount of the purchase price, under the Land Clauses Acts, regard is to be had to the capacity of the works and plant as being in excess of present requirements. All costs are to be paid by the Corporation, including those of the Company's Bill. Officers and servants are to be compensated. The terms of purchase are liberal and comprehensive. The maximum price of 15-candle gas is fixed at 4s. per 1000 cubic feet; and outside consumers are not to be charged a higher rate than those inside the borough.

THE REFEREES' NEW SYSTEM OF PHOTOMETRY.

Dr. Hugo Kruss, the experienced Hamburg photometrist, has contributed to a recent number of the "Journal für Gasbeleuchtung" an article on the method of testing the illuminating power of gas prescribed by the Metropolitan Gas Referees in the spring of this year.

He gives from our pages a description of the new apparatus, and the manner of making observations. He then remarks that the very numerous adjustments of position of the various parts on the table give ample opportunity for the misplacement of one or other part, and that in this respect the method is not a felicitous conception. He points out that, while the earlier "Notifications" of the Referees gave explicit instructions for the use of sperm candles in the closed Evans photometer with the Bunsen or Leeson disc, the whole of this apparatus has now been discarded at one swoop. He considers that the report of the recent Board of Trade Committee on Photometrical Standards * completely discredited the sperm candle as a reliable standard of light, and that Mr. W. J. Dibdin's paper on a "Standard Photometer" † similarly discredited the closed Evans photometer. The new system in which neither the candle nor the Evans photometer is employed is, therefore, in his opinion, a fruit of the aforesaid report and paper. While the resemblance between the German and English methods of photometry has not been greatly intensified by the change, he thinks that the disappearance from the "Notification" of the English measures of length is a boon to all Continental photometrists who may wish to adopt the English system.

Gas Companies' Protection Association.—We learn from the Secretary of this Association (Mr. F. E. Cooper) that the first annual general meeting will be held at the Westminster Palace Hotel, on the 27th inst., to receive the report of the Provisional Committee and to elect a Committee.

An Improved Underground Stopcock.—Mr. W. C. Finch, the Outdoor Superintendent of the Brompton, Chatham, and Gillingham Water Company, has introduced an improvement in stopcocks and other valves placed underground. In order to prevent freezing, they are protected by means of short pipes, either of metal or stoneware, having flanges at each end. The bottom flange may be laid on a brick course or a bed of concrete; and slots can be formed in the sides of the pipe to allow it to be placed over a service-pipe.

Conveying and Elevating Plant.—The New Conveyor Company, Limited, of Smethwick, of which Mr. Gilbert Little is the Chairman and Managing-Director, have just issued a complete catalogue of their various kinds of plant and appliances. It is a book of 188 oblong pages, a large portion of which is devoted to the illustration of plant suitable for gas-works. The Company make the erection of inclined retorts, with "Eclectic" furnaces and automatic machinery, a special branch of their business; and the important installation of these retorts they have put up at Leeds, which is amply illustrated, constitutes an interesting feature of the book, in view of its extent and yesterday's visit to the works. The book is strongly bound and lettered.

Production of Acetylene Gas in France.—Writing on this subject, the American Consul at Havre says: "In regard to the production of acetylene gas from calcium carbide in France, there are no official statistics bearing upon the annual output of carbide, so that the amount furnished yearly by the different manufacturers has to be estimated. These estimates vary from 1000 to 5000 tons per year from each factory. There are ten factories at present engaged in the manufacture of carbide of calcium in France; and four factories are under construction. They will be able to produce, when running at their full capacity, from 2500 to 3000 tons per year. The wholesale price of carbide of calcium in France is from 350 to 400 frs. per ton, exclusive of the cost of packing. The cost of packing is 4·50 frs. per iron drum containing 50 kilos. (110 lbs.), 6 frs. per drum of 100 kilos. The carbide of calcium manufactured in France is guaranteed to give 300 litres (10·6 cubic feet) of gas per kilo. The output is constantly increasing, and the supply is fully equal to the demand. The retail price of the article is from 55 frs. to 60 frs. per 100 kilos., not including packing. There are two villages in France completely lighted by acetylene, by the Société Franco-Espagnole du Gaz Acétylène. They are Alzonne, in the department of Aude, a town of 1506 inhabitants, and Saurat-par-Tarascon, in the department of Ariège, a place of 3024 inhabitants."

* "Journal," Vol. LXV., p. 1010. † *Ibid*, Vol. LXVII., p. 1442.

GARCKE'S "MANUAL OF ELECTRICAL UNDERTAKINGS FOR 1898-9."

We have received from Messrs. P. S. King and Son, of Westminster, a copy of the above-named work, which is the third annual issue of the Manual. From the commencement, the compilation of the contents of this valuable book has been done under the supervision of Mr. Emile Garcke, M.Inst.E.E., F.S.S., whose aim has been to make each edition better than its predecessor. This is evidenced by the fact that, whereas the first volume contained 490 pages, and furnished particulars as to 172 undertakings, the second numbered 598 pages, and the third contains 738 pages—the number of undertakings dealt with being respectively 274 and 412. The whole of the data are derived from official sources, and for the most part have been verified by responsible officers of the undertakings concerned. Among the improvements noticeable in the present volume may be mentioned the addition of the addresses in the Directory of Officials. The maps of the electricity supply areas within the County of London have been brought up to date by the insertion of all mains laid during the year. A large coloured diagram, showing the average revenue per Board of Trade unit of electricity sold and the cost of production at the various undertakings mentioned in the body of the work, furnishes at a glance much useful information. The general get-up of the volume ensures its retention of the position it has attained as a book of reference.

A SELF-IGNITING DEVICE FOR GAS-BURNERS.

The self-ignition of gas has been a subject prolific in patents; but nearly all of the devices have been more or less imperfect. Some of the most ingenious of the arrangements have been the product of the inventive faculty of Mr. J. F. Duke; but his designs—at any rate his early ones—were not altogether free from objection. As was shown, however, by an abstract of a specification published in the "Journal" for May 4, 1897, Herr H. Borchardt, of Berlin, devised means for the purpose of overcoming the weak points in Duke's original proposals; and the igniter which he designed appears to be (writing on only the briefest acquaintance with it) the most promising of those we have yet seen. The rights in the invention have been acquired by the Matchless Gas Lighting Syndicate, who have also purchased Duke's original patents, and others which in any way anticipated Borchardt's. The improved igniter is for a few days on view at the Holborn Restaurant, where its application to various kinds of burners can be seen and tested. It is particularly adaptable to incandescent burners; three of its advantages in this direction being that the mantle is gradually heated, there is no injurious shock to the mantle as is frequently experienced when lighting with a match or taper, and there is no deposition of carbon on the mantle as is often the case with the ordinary flash-jet. Of course, it cannot be denied that where incandescent lights are in careful hands, a nicely adjusted flash-light will be found equally advantageous in these respects; but the difficulty is to get people to give proper attention to the adjustment of the by-pass, and so trouble ensues, which the igniter seems capable of obviating. On the point of economy, however, for ordinary domestic purposes, taking the cost of the igniter into consideration (4s. 6d.), there can be little to choose between it and the ordinary flash jet, excepting where it effects a saving in mantles. The arrangement is enclosed in a brass casing which is readily connected to the fitting below the burner. The portion of the device under the burner contains a double-seated valve which is reversed by a one-armed lever in the interior of a tube projecting laterally from the casing, and ascending by the side of the burner. A connecting-rod in the vertical tube catches the lever by means of a lower eyelet, and is held fast by a wire running through a porcelain tube which surmounts the device. This tube is supported by a bush, which is moved in an upward direction by an adjusting-screw, so that the wire which rests on it at the top can be tightened by turning the screw. This check motion is naturally transmitted to the connecting-rod, which, in its turn, draws up the loose end of the reversing-lever, and is bent on to it with a sagging motion. As the valve is joined on to this lever, the tightening of the wire causes the valve to be pressed against its upper seat. Owing to this, the supply of gas passing from below into the device is prevented from flowing to the outlet to the burner. The gas consequently passes to the vertical tube, from a minute aperture in which a small stream is emitted. This comes into contact with a small piece of platinum sponge, which at once gets incandescent. The heat is communicated to platinum wires wound round the igniting agent; and the white heat of these wires causes the ignition of the outstreaming gas. The flame touches the porcelain tube; and the heat causes the wire in the latter to distend, so that the connecting-rod which has been pressing the valve against its upper seat, begins gradually to sink downwards, supported by the pressure of a spiral spring surrounding it. A supply of gas is consequently passed to the lighting burner; and, on being ignited by the small jet of flame on the vertical tube, it causes a still further distension of the wire, so that the valve sinks further down—leaving an entirely free passage for the gas

to the burner, and completely stopping its access to the igniting circuit. On the lighting flame being extinguished, the cooling of the wire causes it to contract, and consequently the valve is lifted, and pressed once more against its upper seat. These are the main features of the construction of the appliance, which is really not so complicated as a written description would lead one to suppose is the case. All the parts are interchangeable, and can be renewed at a trifling cost. One can easily conceive many conditions under which this igniting agent could be usefully, and even profitably, employed. For example, in premises where inflammable goods are stored, it would be a safeguard against fire; where lights are situated at a high elevation, such as in public buildings, it would be of service; and, by its assistance, a saving of gas might be effected at railway stations and in gas-lighted trains, as it would be possible to control simultaneously from one central stopcock a large number of burners.

PERSONAL.

Mr. G. W. Lacey, the Secretary of the gas and water undertakings of the Corporation of Saffron Walden, has obtained a similar appointment at Oswestry. At the last meeting of the Town Council, when Mr. Lacey's resignation was tendered, the Mayor acknowledged his efficient services during the four years he had been at Saffron Walden, and expressed the regret of the Council at losing them.

Subway Construction.—A prize of $250 has been offered by the "Cosmopolitan Magazine" for the best essay on the arrangement and construction of subways for carrying the sewers, water and gas pipes, and other conduits of great cities.

Institution of Mechanical Engineers.—At the next ordinary meeting of this Society, to be held at the Institution of Civil Engineers on the 26th and 27th inst., under the presidency of Mr. S. W. Johnson, one of the papers to be read will be on the "Electrical Installations for Lighting and Power on the Midland Railway," by Mr. W. E. Langdon, the Superintendent of the Company's Electrical Department at Derby.

An Acetylene Test-Flame for Flashing Point Determinations.—The want of a suitable flame for the ignition of the oil vapour in determinations of the flashing point of oil is keenly felt when coal gas is not available. In some forms of apparatus, an electric spark is used in place of a flame; and in others a small oil lamp furnishes the test-flame. But neither of these is so satisfactory as the small gas-jet which is commonly used with the Abel and Pensky-Martens forms of apparatus. When, however, coal gas is not at hand, a substitute has to be employed. Dr. P. Wolff recommends acetylene, which can be generated on the spot, and used not only to supply the small test-flame, but also to heat the oil to its flashing point.

The Municipal Engineering Classes at University College.—Last Wednesday, Professor Osbert Chadwick, M.Inst.C.E., delivered at University College the Inaugural Address on opening the course of municipal engineering and lectures on municipal hygiene instituted by the Trustees of the late Sir E. Chadwick, to which reference was made in the "Journal" a fortnight ago. The Trustees have devoted £700 a year to the endowment of a professorship and a lectureship in connection with the above subjects, and a further sum of £1000 for the equipment of a laboratory. Mr. Chadwick explained the objects of the lectures, and stated that the laboratory would be open to students for practical experiments with air, water, gas, and other branches of practical chemistry. To assist the student to practical experience, the Chadwick Scholarship of £100 had been instituted to be paid as an honorarium to a practising engineer taking the student as pupil, or to augment the small salary a student might receive as improver.

Water Supply Diagrams.—In a recent number of the "Engineering Record," there was a description of the equipment of the Engineering Department of the Metropolitan Water Board of Boston, Mass. (U.S.A.), an interesting feature of which is the arrangement for recording the condition of the supply. The water for the Metropolitan district is drawn from Lake Cochituate, eight reservoirs on the Sudbury River, and the Nashua River, through three aqueducts. Daily reports of the elevation of the water surface of each reservoir and of the rate of flow through each aqueduct are sent to the Boston office. To exhibit this information conveniently for general reference, a large board neatly painted, suitably labelled, and provided with rows of hooks is hung in one of the office rooms. There is a wooden tablet for each reservoir and aqueduct, usually 3 in. by 10 in., with a groove 1¼ inches wide and 5-16ths inch deep, extending from the bottom to within ¾ inch of the top. On the left side of the groove the face is graduated to feet and hundredths, to show the elevations of the water surface above the datum of levels, and the right side is graduated to show capacities in millions of gallons corresponding to the heights opposite. In the groove is a spring sliding block carrying a double pointer. The tablets for the aqueducts show depths of water above the invert and corresponding rates of flow. The pointers are set each day when the reports are received. On one row of hooks hang the tablets of those reservoirs and aqueducts which are furnishing water, and on another row hang the others. Anyone can from this diagram at once read the state of the supply.

OBITUARY.

Robert Hunter.

The few lines which appeared in the last number of the "Journal" with respect to the serious condition of Mr. Robert Hunter, of Chester, will have prepared our readers for the announcement which we regret to have to make to-day, that his illness terminated fatally on Tuesday morning. Mr. Hunter had not been in good health for about a year; but he was able to discharge his customary duties. He attended the meeting of The Gas Institute in Belfast; but it was then apparent that he was not so well as one could wish. In August his condition was such that it was deemed by his medical attendant advisable that he should take a sea voyage; and his Directors considerately arranged for a trip to the Canaries for a month. He started on the 19th of August, and arrived back in St. Katherine's Docks on the 16th of September, spent the week-end at Eastbourne, and reached Chester on the following Monday evening. In a letter received from him the next day, he said: "I am glad to say I feel very much better than when I started; but, unfortunately, I caught a little cold coming up the Channel, and have not yet been able to throw it off. I enjoyed the trip very much indeed." Unhappily, it was not productive of real benefit, for Mr. Hunter had not been again at his duties many weeks before he was seized with paralysis while sitting in his office. His medical man was promptly summoned, and a specialist was called in. But the case was seen to be hopeless from the first, and the patient gradually lost strength, and succumbed.

Mr. Hunter was born near Edinburgh, and commenced his professional career in the Metropolis in the service of the London Gas Company. He subsequently took the management of the Pará Gas-Works. On completing his engagement, he returned to England, and accepted an appointment with the Phœnix Gas Company. This he relinquished to become Gas Manager at Stalybridge—a position he held till ten years ago, when he went to Chester in succession to Mr. Fletcher W. Stevenson, who had obtained the appointment of Engineer to the Sheffield United Gaslight Company. While he was in the service of the Phœnix Company in 1874, he joined the British Association of Gas Managers; and he never severed his connection with the organization. Though not conspicuous by contributions to the proceedings, he was a very regular attendant at the annual gatherings. At the Bath meeting, however, as will be remembered, he read a paper on "The Spiral-Guided Holder at Chester." Mr. Hunter was one of the early members of the Manchester District Institution of Gas Engineers, having been elected in 1875; and for many years he filled the position of Honorary Secretary. In 1884 he succeeded Mr. Charles Eastwood as President, and during his year of office he read a paper on "Gas-Works Capacity in Manufacturing and Non-Manufacturing Districts." Mr. Hunter never aspired to be a public man; but among his own circle of acquaintances and business and professional colleagues he was highly respected. He was a Freemason, and, though resident in Chester, he maintained his connection with his Lodge at Stalybridge. He was a member of the Evening Star Lodge up to a year or two ago. Deceased was 59 years of age. He leaves a widow and large family, the youngest of whom is only about two years of age; and deep sympathy for them is felt in Chester—and we are sure it is shared by the members of the gas profession who knew Mr. Hunter—in their great bereavement. The funeral took place last Saturday at the Chester Cemetery, and was attended by many personal and other friends, including several members of the Manchester District Institution, and Masonic brethren from the Lodge at Stalybridge. The Chairman and officials of the Gas Company, with a large number of the employees, took part in the ceremony; the body being borne to the grave by one of the gangs of stokers.

The Derivation of the Word "Gas."—Some fresh light was thrown upon this subject in a paragraph which appeared in the "Journal" early last year, where, on the authority of the "Daily Chronicle," it was stated that Dr. Franz Harder had discovered, in the Latin text of the works of Van Helmont, a distinct statement that the great chemist had derived "gas" from the Greek Xáos, and not from the Dutch *geist* as was generally supposed. We remarked at the time that, as Dr. Murray had not come to the letter "G" in his "New English Dictionary," we did not know what were his views on the subject. This stage of the undertaking has, however, now been reached; the double section of the fourth volume of the Dictionary issued on the 1st inst. extending from "Ga" to "Ger." It is the work of Mr. Henry Bradley, the joint Editor with Dr. Murray. In a Prefatory Note, the characteristic features of the section are enumerated; and mention is made of the derivation of the word "gas"—Dr. Harder being supported. The Editors say: "The true derivation of 'gas,' which rests on an express statement of the well-known inventor of the word, has not before appeared in any English dictionary, though it was stated in the great Dutch dictionary as early as 1873." Van Helmont's words are "*Halitum illum* gas *vocavi, non longe a chao veterum secretum.*" This disposes of the *geest* (spirit) and *geist* (ghost) derivations, which have been put forward by etymologists.

TECHNICAL RECORD.

THE EXTENSION SCHEME AT THE SALTLEY GAS-WORKS, BIRMINGHAM.

The gigantic scheme of extension which the Birmingham Corporation Gas Committee have undertaken at their Saltley station, and which practically involves the construction of a complete new works, is, in its prominent parts, being rapidly advanced. It has not been taken in hand before necessity demanded it; and, costly though the scheme will be owing to its extensiveness, the drawings and the work so far executed bear testimony to the fact that the designer, while ensuring excellent and durable plant, has, by its admirable disposition and by applying, so far as he approves, the improvements that latter-day engineering knowledge has suggested, kept in sight the realization of economy in expenditure and ultimately the most remunerative working results. The consummation of the full scheme will entail some years of labour; but it is not even now too early to say that the important section of the work on which numerous hands are at present busily engaged will long in the future bear witness to the skill of its projector, Mr. Henry Hack, M.Inst.C.E., the Engineer of the Saltley works.

The extension of the storage plant is the principal work now in progress. At the time of the transfer of the old Companies to the Corporation in 1875, the greatest daily output of gas at Saltley was 5½ million cubic feet; and the storage capacity was a little under 4¼ millions—viz., No. 1 gasholder (two lifts), 149 ft. 4 in. diameter by 32 ft. deep, and 1,030,000 cubic feet capacity; No. 2 gasholder (single lift), 187 ft. 4 in. diameter by 41 ft. 4 in. deep, and 1,065,000 cubic feet capacity; No. 3 gasholder (single lift), 187 ft. 3 in. diameter by 41 ft. 4 in deep, and 1,075,000 cubic feet capacity; No. 4 gasholder (two lifts), 160 feet diameter by 32 feet deep, and 1,200,000 cubic feet capacity. In 1876 the Gas Committee authorized the construction of a telescopic holder (No. 5) of 197 ft. 6 in. diameter and 36 ft. deep, with a capacity of 2 millions, on the then recently acquired land at Nechells. This was designed by Mr. Charles Hunt, M.Inst.C.E., Engineer of the Windsor Street station; Mr. Hack being then engaged in designing and carrying out extensions of carbonizing and other portions of the plant. In 1878, the Committee further sanctioned the adding of an additional lift to each of Nos. 2 and 3 holders; increasing the capacity of each from about 1 to 2 millions. These additions brought up the Saltley storage to something like 8¼ millions, at which it has remained up to the present. The daily output of gas, however, has increased from 5¼ millions in 1875 to 14 millions in 1896; and consequently the storage shows a great deficiency. Until last year this has been met to an extent by the excess storage at Windsor Street, provided by the two large holders at that station; but owing to the growth of the Windsor Street works, this excess storage can no longer be permanently relied upon for the assistance of Saltley. The Committee therefore considered in what way the storage at Saltley could be best and most economically brought up to the right standard; and it was decided to add two more lifts to No. 5 holder (increasing the capacity from about 2 million cubic feet to 4 millions), and to construct an entirely new tank and four-lift holder alongside it for 8¼ millions. This, when completed, will bring up the storage at Saltley to 18¾ millions, or about 4¾ millions in excess of the hitherto greatest daily output—an excess that, with the continued growth of the undertaking at its recent rate, will be overtaken in about six years.

Those of our readers who have interested themselves in the recent history of Birmingham gas affairs, as recorded in the "JOURNAL," will remember the discussion which took place in the City Council when the Gas Committee introduced Mr. Hack's extension scheme, and which discussion showed that some of the councillors had but a dim perception of the needs of the situation, notwithstanding the lucid statement of the Chairman of the Committee (Mr. Alderman Pollack). A short time since it occurred, or was suggested, to that gentleman that it would be a good thing if his Committee invited members of the Council to visit the works in progress, and the site of those for which the necessary expenditure was voted at the meeting referred to. The Committee cordially fell in with the idea; and accordingly arrangements were made for an inspection last Wednesday. A large number of the city fathers took advantage of this opportunity of making themselves acquainted with the details of the scheme under exceptionally favourable circumstances. They were accompanied by the Lord Mayor (Mr. C. G. Beale), Alderman Pollack, the Secretary of the Gas Department (Mr. Edwin Smith), and other Corporation officials. What the party saw and heard on the works must have considerably enlightened many of them, and should in a corresponding degree be of assistance to the Chairman of the Gas Committee in future in the Council Chamber. Having been received by Mr. Hack, the visitors were invited into a temporarily constructed building, in which were exhibited plans and photographs illustrating various portions of the new work. Here, in a neat little speech, Alderman Pollack welcomed the company; remarking that the Gas Committee felt proud at having been enabled to bring together that day such a large number of the members of the Council. He also expressed the admiration of the Gas Committee for the many services which had been rendered to the department both by Mr. Hack and Mr. Hunt—particularly for the ability which they had shown in the designing of new works at their respective stations. Mr. Hack followed with an explanation of the work involved in the extension scheme; and the principal parts of his statement and further particulars with which he subsequently furnished us are embodied in the description of the works given below. The visitors were then divided into five parties; the first being headed by Mr. Hack and the others by Messrs. Morrison, Richmond, Hewett, and Chamberlain. These gentlemen were also assisted in affording information by Mr. Basil P. Ellis, of Messrs. John Aird and Sons, the contractors for the new gasholder tank, Mr. Alfred Featherstone, of Messrs. C. & W. Walker, the contractors for the new holder, and Mr. W. W. Skidmore Westwood, of Messrs. Westwood and Wrights, the contractors for the enlargement of No. 5 holder.

THE EXTENDED HOLDER.

The visitors were first conducted to see the work in progress on holder No. 5. This was only commenced in March or April last; and already the tank is being refilled with water, and the holder will be ready for service before the depth of winter sets in. Of course, before the actual extension could be taken in hand, a great deal of labour was involved in cutting out and removing the old work. The space required for the addition of the two lifts was provided by shortening the radius of the crown of what was the inner lift by 2 ft. 6 in., and applying a grip or inverted cup to the old side, which then became the third lift from the centre. An entirely new second lift with cups, grips, and stiffeners was next built up; and a new strong curb, sides, and cup, were added to the diminished diameter, thus forming the inner lift. Although the foregoing represents the bulk and principal part of the work, the extension involved a large amount of alterations and additions to the vertical guides, stiffeners, stays, rollers, and carriages. A combination of radial and tangential rollers has been adopted for the additions. Regarding the guiding of the extended holder, the Committee adopted Mr. Hack's recommendation to raise the framing one lift only; letting the inner lift run out, and keeping the junction of the inner and second lifts below the top of the framing. For this purpose, the top girders and entablatures of the columns of the old frame had to be taken down, new middle entablatures and a middle tier of girders provided, the columns lengthened, and the old girders (after having been considerably strengthened) raised and re-fixed at the top, together with the old entablatures and caps as a finish. In addition, the framing has been materially strengthened by making all the girders a continuous strong ring, and introducing a system of strong channel steel bracing. In order to ensure the top rollers of the inner lift coming back safely into the guide-run on the column in descending, a bell-mouthed steel casting has been formed at the top of each of the guide-runs. No wrought iron has been used in the gasholder work and girders, but steel, capable of resisting a tensile strain of 28 to 32 tons per square inch, and an elongation of 25 per cent. The cost of the original tank and holder came to £18 3s. 6d. per 1000 cubic feet for 2 millions; while the 2 millions provided by the duplication of the lifts will cost £7 15s. per 1000 cubic feet—bringing the average cost for the 4 millions storage to £12 19s. 3d. per 1000 cubic feet. The crown is non-trussed. The weight of the old material taken out and dispensed with was 72 tons; the weight of the new material in the floating portion is 375 tons; and of the new material in the framing 330 tons.

THE SECOND LARGEST HOLDER IN THE WORLD.

In close proximity to No. 5 holder is the partly constructed No. 6 holder, which is designed for containing 8¼ million cubic feet, and will consequently rank next in size to the 12 million cubic feet holder at East Greenwich. Naturally a great deal of curiosity was evinced in this magnificent piece of work by the councillors, most of whom probably for the first time in their lives saw what the interior of a gasholder was like. There was the immense open tank, with its concrete and cement covered core, and with timber framing for supporting the crown of the holder spreading out like a huge umbrella frame, together with practically all the steel work of the four lifts in position—upon all of which the guides were plied with numerous inquiries. The tank, constructed by Messrs. John Aird and Sons, is 264 feet in diameter. The erection of the holder is proceeding apace; and the structure will be ready for service in good time before the winter of 1899. The first piece of steel work was placed in the tank by Messrs. Walker on July 6; and in the short time that has since elapsed, they have fixed in position 874 tons. The tank is constructed of brickwork and concrete, rendered entirely throughout in Portland cement. When selecting this method, Mr. Hack had to consider the nature of the ground, the facilities for obtaining clay, and sundry other circumstances. The first thing that was done in the present instance (a step which Mr. Hack considers should always be taken as regards all deep excavation work, where the nature of the ground is sand and ballast, and in which water abounds) was to sink a large square sump several feet below the deepest part of the excavation, having it finished, or nearly so, before the excavation for the walls was commenced; thus getting the water around well down ahead of the trench work, to which the sump was connected by a cross trench. In this way, what would otherwise

have been troublesome stuff to deal with was brought to a state easy to cope with; most of the sand coming out like sugar. The method adopted for constructing the walls was the usual one for large tanks. A continuous, well timbered, circular trench was first made. This Mr. Hack speaks of as a fine piece of work, of which any contractor might feel proud—every strut radiating truly to the centre of the tank, and each strut perfectly plumb one above the other from top to bottom. Notwithstanding this, there were one or two places in the silty sand level, which required great precautions at great expense. For the timbering, the contractors used 66,840 superficial feet of 3 inch and 4 inch planks and 46,856 cubic feet of timber for struts. As the building of the wall proceeded, the cross timbers were struck, and the back planks drawn; fresh shorter struts being placed between the inner ring of timbering and the wall, to keep up the earth on the inside—the whole of the wall being carefully backed up with sand in even layers, well watered and rammed. When the wall was built to the height of the level of the ground, the contractors commenced to take out the "dumpling," and to shape it. The excavation being completed, the bottom of the tank, and all over the cone was concreted with part portland cement and part lias lime concrete, varying in thickness from 22½ inches at the bottom to 12 inches at the top; the space between the foot of the cone and the wall having in addition half brick paving on edge set in cement, in which at intervals of 13·75 feet in the circumference the landing stones for the gasholder are built. The next step was to render the whole of the walls from top to bottom, as well as over the entire surface of the cone, with portland cement rendering ¾-inch thick, finished to a smooth surface. Oak blocks are fixed in the wall for the attachment of the channel iron guide-runs for the bottom rollers of the outer lift. The bottom of the trench for the wall was in sandstone, and upon this was placed a solid platform of concrete in portland cement 10 ft. 3 in. wide, and 2 feet thick. When the excavation of the cone was being proceeded with at the foot, the edge of this concrete had to be bared; and it was found that the platform of concrete had set like flint. During the construction of the tank, it is estimated that 240 million gallons of good water have been pumped into the River Rea.

The following further particulars relating to the tank may be interesting: In excavating, the strata passed through were: Made up soil, 2 ft. 3 in.; sandy marl, 2 ft. 3 in.; sand and ballast mixed, 24 feet; silty sand, 12 feet; sand, 1 foot; then sand rock extending to the bottom of excavation. Depth of natural water line below coping level, 22 feet; total depth of sump below coping level, 51 feet; greatest depth of trench for the inlet and outlet pipes below the coping level, 53 feet; depth of other portions below the coping level, 47 feet; quantity of water pumped per hour, about 25,000 gallons; diameter of tank, 264 feet; thickness of wall between piers at bottom, 6 bricks; ditto at top, 3 bricks; thickness of intermediate piers, 7 bricks; width of intermediate piers, 6 bricks; thickness of main piers, 8 bricks; width of main piers, 9 bricks; excavation in timbered trench, about 20,000 cubic yards; excavation inside trench and on cone, about 47,000 cubic yards; concrete, about 4250 cubic yards; brickwork, 6886 yards; number of bricks used, 2½ millions; stone, 3000 cubic feet; tank framing, timber, 5500 cubic feet; tank framing, cast iron, 80 tons; tank framing, wrought iron, 32 tons; oak blocks for tank-guides, 700 cubic feet; hoop iron bond, 14 tons; cement used, 750 tons; lime, 450 tons.

The new holder consists of four lifts—41 ft. 6 in. deep, and 261 ft. diameter; 41 ft. 9 in. by 258 ft. 3 in.; 42 ft. by 255 ft. 6 in.; and 41 ft. by 252 ft. 9 in. respectively. Instead of cast-iron columns as in No. 5, steel standards, with steel pile iron struts and ties, have been designed. The standards are 5 ft. 5 in. by 4 ft. 6 in. at the base, tapering to 2 ft. by 1 ft. at the top; the whole being braced together with flat bar bracing front and back of the standards, studded apart at intervals. It is confidently hoped that the holder will be sufficiently advanced by the 30th inst. to admit of water being put into the tank to a sufficient height to allow of the adjoining tank (No. 5) being quite filled up about that date. In carrying out the two works simultaneously, this desideratum has been an important consideration; for, having regard to the nature of the ground, it would be risky to fill No. 5 without partially filling No. 6. The cost of the tank and holder together will, including work done and to be done by the Gas Committee, be about £72,000. This works out to £8 14s. 6d. per 1000 cubic feet capacity. It may also be mentioned that, in the floating portion of the holder, the total weight of steel will be about 1220 tons; and in the guide-framing about 933 tons. The estimated pressure that the holder will throw with one lift is 4·3 inches; and with four lifts, 10·5 inches. It may be mentioned that the managers for Messrs. Aird and Sons' work were Messrs. Powell and Robinson; for Messrs. C. & W. Walker, Mr. John Monk; and for Messrs. Westwood and Wrights, Mr. Rickard.

Further Extensions.

The gasholders completed the actual work in progress so far as the gas plant was concerned; and the councillors were next shown the sites where further extensions are to be made. They first passed into the Nechells Recreation Ground, over the prospective absorption of which into the Saltley works there has been a good deal of agitation. It was purchased years ago by the Gas Committee with an eye to the future extension of the works; and, in their goodness of heart, they lent it to the inhabitants of the district until such times as it should be required. Now, however, they have taken in a portion of it; and the residents think they are being hardly dealt with. But it will be some years before the Committee fully reclaim it; and in the meantime there is no doubt other suitable ground will be found for the purposes of recreation. Extensions of carbonizing and condensing plant are to be made on the Nechells ground, to which canal access is easy, reserving the available remainder of the Devon Street site for the exhausting, purifying, and measuring plant. Up to the present, the principal work let by contract for these extensions is the new retort-house. This will be 324 feet long, 114 feet wide, and 42 feet high from the ground to the roof shoe-plates; and it is intended to equip it with four benches of inclined retorts—in all 416—capable of producing a minimum of 5 million cubic feet per diem when all the retorts are in action. In all the subsequent plant between the retort-house and the gasholders (the details of which have not yet been completed), the most modern and best labour-saving appliances will be adopted. In connection with the extensions of the coal-gas plant, the attention of the councillors was called to the diversion of the River Rea sewer (now being carried out), which at present runs inconveniently through the Gas Department land; and also to the narrowing in to its original width, by walls, the course of the River Rea. The state of the Rea banks through the gas-works and beyond, to say the least, has been for a long time a subject of reproach. All this will be remedied by the improvements decided upon, between the Public Works Committee and the Gas Committee, although at very great cost to the latter—the work including the arching in of 300 feet of the Rea to form a coke-yard. The extensions on the Nechells site further include a canal basin, 240 feet long, and 25 feet wide, for facilitating the removal of coke.

Having completed their inspection of the last-mentioned work, a hasty visit was paid by the councillors to the water-gas plant, which was erected by the Economical Gas Apparatus Construction Company. It is capable of producing about 4 million cubic feet of gas per day; and there is room for an extension of the building to accommodate sufficient apparatus to yield a further 2 million feet.

By the kindness of Alderman Pollack, the visitors were afterwards entertained at tea, which formed a fitting occasion for the Lord Mayor and Alderman Hart to make some complimentary and approving remarks concerning the work of the Gas Committee and of Mr. Hack, and which remarks appeared to be cordially endorsed by everyone present. During tea, the works band played some selections of music, which were exceedingly well rendered.

RAILWAY CARRIAGE LIGHTING BY OIL GAS.

The change from oil lighting to gas lighting for railway carriages which has taken place upon most of the railways during the past few years has been fully appreciated by the travelling public, although the light has, in many cases, hardly been sufficient to make reading a comfortable operation; and now that the perusal of morning and evening papers has become an essential factor in the journeyings of business men to and from the City, it is of paramount importance that, even at the expense of a little more gas, the Railway Companies should do their best to give their customers in all classes the best light available. We have on more than one occasion drawn attention to the fact that several of the Railway Companies have adopted "Coligny" gas-lamps for lighting their carriages; but we have not had an opportunity of explaining their characteristics. The lamp is an application of the well-known recuperative principle to lamps for railway carriages, where, in view of the extraordinary conditions under which all the lamps run, the difficulties must necessarily be considerable. Unless the air for supporting combustion can be supplied at a very high temperature, the recuperation cannot, of course, be maintained; and while it was found to be a simple matter to do this when the speed of the train did not exceed 20 miles an hour, it was for a long time thought that the greater velocity at which main-line trains are now run in this country would prove an insurmountable obstacle in the way of utilizing this principle of gas lighting. The Lamp Manufacturing Company, however, seem to have overcome all the difficulties, and their "Coligny" lamps are now in use on most of the railways, in trains of which the speed attains to even 70 miles an hour. The light afforded can be more or less as desired without altering the burners, which it appears is not the case with the flat-flame burner lamps already largely in use. The Company have now adapted the same principle to these lamps, so that all the advantages of recuperation may be obtained by merely adding the new "Coligny-Welch" patent reflector. We are informed that, after exhaustive trials with these reflectors, the Paris, Lyons, and Mediterranean Railway Company have just ordered a considerable number of them, finding that the increased light with the same consumption of gas was very great; while some of the English Companies are trying the reflectors with a view to testing their adaptability and suitability. We may add that the Engineers of the above-named Company tested the "Coligny-Welch" reflector also with a mixed gas composed of 80 per cent. of oil gas and 20 per cent. of acetylene; and we believe the improvement was found to be even more marked than with oil gas alone.

THE VALUE OF SULPHATE OF AMMONIA FOR WHEAT GROWING.

In the "JOURNAL" last Tuesday, reference was made to the value of sulphate of ammonia in wheat and barley growing, as shown by the results of experiments carried out at the farm of the Royal Agricultural Society at Woburn, and communicated to the last number of the Society's "Journal" by Dr. J. A. Voelcker. More than usual interest attaches to these results in view of the large prize offered by the Sulphate of Ammonia Committee for the best essay on "The Utility of Sulphate of Ammonia in Agriculture;" and we therefore give the tables in which they are recorded.

Dr. Voelcker offers the explanation that, for the past twenty years, crops of both wheat and barley have been grown on the same land, and with the same manures applied, year after year. The produce of corn and weight per bushel have been duly recorded throughout; but until now no attempt has been made to compare the produce of the different plots in respect of quality or market value. Following, however, the precedent of Rothamsted, it was decided by the Chemical Committee of the Society to have the experimental wheat and barley crops valued by experts, and to deduce therefrom any conclusions that might be obtainable as to the influence which any particular manure had exercised on the quality of the corn produced over a period of a certain number of years. The services of two experts, one of whom had done similar duty at Rothamsted, were enlisted. The corn crops of 1897, after being threshed in the field, and the corn subsequently winnowed and weighed, had been kept in the barn—the produce of each plot still separate. The corn was once more cleaned, until its condition was such that it could be offered for sale; and in May this year the two valuers went down to Woburn to inspect the samples, give their general observations on them, and affix money values. At the time of valuing, the price of corn of all kinds had received considerable impetus, on account of the war; but, seeing that the object was rather to compare on general grounds, and not as being influenced by special and temporary circumstances, the produce of plots differently treated, the valuers adopted as their basis of calculation the prices which the corn crops of the year might, under normal circumstances, be taken as being worth. The value adopted for wheat was 37s. per quarter. The figures in the table show the produce per acre.

Permanent Wheat, 1897 (*21st Season*).

[Wheat grown year after year on the land; the manures being applied every year.]

Plot.	Manures per Acre.	Dressed Corn.		Tail Corn.	Value per Quarter.
		Bushels.	Weight per Bushel.	Weight.	
			lbs.	lbs.	s. d.
1	Unmanured	7·10	63·50	38	37 0
2	Ammonia salts* (containing 50 lbs. ammonia)	11·80	62·37	59	37 0
3	Nitrate of soda (containing nitrogen = 50 lbs. ammonia)	10·60	57·25	121	35 0
4	Mixed mineral manures† (sulphates of potash, soda, and magnesia, with super-phosphate)	7·70	63·00	52	37 0
5	Mixed mineral manures and ammonia salts (containing 50 lbs. ammonia)	20·65	62·56	81	38 6
6	Mixed mineral manures and nitrate of soda (containing nitrogen = 50 lbs. ammonia)	17·60	59·87	138	36 0
7	Unmanured	7·70	62·75	31	37 0
8*a*	Mineral manures and (in alternate years, 1897 included) ammonia salts (= 100 lbs. ammonia) in addition	24·20	63·00	93	38 6
8*b*	Mineral manures, ammonia salts (= 100 lbs. ammonia) omitted (in alternate years, including 1897)	16·40	63·75	56	38 6
9*a*	Mineral manures and (in alternate years, 1897 included) nitrate of soda (containing nitrogen = 100 lbs. ammonia)	20·70	59·75	120	36 6
9*b*	Mineral manures, nitrate of soda (= 100 lbs. ammonia) omitted (in alternate years, including 1897)	9·80	63·00	46	37 0
10*a*	1889, rape cake (= 50 lbs. ammonia). No manure since.	9·30	62·25	42	37 0
10*b*	Rape cake (= 100 lbs. ammonia) every year since 1890	22·40	61·62	90	36 6
11*a*	1877-81, farmyard manure (= 200 lbs. ammonia). No manure since	8·60	62·25	42	36 6
11*b*	Farmyard manure (= 200 lbs. ammonia) every year	16·00	61·25	92	36 6

* Ammonia salts are equal weights of sulphate of ammonia and muriate of ammonia.

† Mixed mineral manures are, throughout, 3½ cwt. of superphosphate of lime, 200 lbs. of sulphate of potash, 100 lbs. of sulphate of soda, 100 lbs. of sulphate of magnesia per acre.

Remarks.—(1) Better grown than No. 2, but not so strong. (2) Stronger wheat than No. 1. (3) Worst of all plots. (4) Very similar to No. 9*b*, and nearly equal in strength. (5) One of the best; not quite so well grown as No. 8*a*. (6) Worst of all, except No. 3. (7) Nearly as good as No. 1; possesses some bloom. (8*a*) Best and strongest of all; stronger than No. 8*b*, and a miller would prefer it to that. (8*b*) Best grown of all, and freest from light corn. Not so strong as No. 8*a*, but would give more flour. (9*a*) A strong wheat, but low in produce of flour. (9*b*) Slightly preferable to No. 4. (10*b*) A little paler than No. 11*b*. (11*a*) About as good as No. 9*a*, but rather better grown.

Arranging the produce of the various plots in the respective order of merit they might be thus grouped: Above the average, 8*a*, 8*b*, 5; about the average, 10*a*, 9*b*, 4, 2, 1 and 7, 10*b*; below the average, 11*a*, 9*a* and 11*b*, 6, 3.

Commenting upon the figures in the table, Dr. Voelcker says: "As a whole, the wheat from the plots was of fair quality, and some—notably that from the plots manured with mineral manures and ammonia salts—was decidedly above the average. These were the best of all the series; and it is noticeable that there was but little difference of quality whether ammonia salts (the heavy dressing) had been applied in the year under notice (8*a*) or the year previous (8*b*). When a comparison was instituted between these plots, manured with ammonia salts, and those manured with nitrate of soda (3, 6, 9*a*, and 9*b*), a marked difference was found; the nitrate having produced the poorest quality samples of all, the corn being thin and shrivelled. Other noticeable features were the marked increase in the amount of tail corn in the plots manured with nitrate of soda, and the much lower weight per bushel of the dressed corn. Nor was the wheat grown with farmyard manure (11*b*) of good quality; while that with rape cake (10*b*) was no better—both being inferior in quality to the unmanured crops (1 and 7), and to the crop treated with mineral manures only (4). The unmanured plots, it will be observed, gave the least offal corn. The main points brought out are, therefore, the marked superiority of ammonia salts to nitrate of soda; the former producing a higher quality and good-weighted wheat, without excessive offal, while nitrate of soda has given a bad quality grain, of light weight, and containing much offal."

ANOTHER PURIFIER ARRANGEMENT.

Our readers may remember that at the last meeting of the Ohio Gaslight Association Mr. Irvin Butterworth, of Columbus, described a purifying-box on a new principle, devised by Mr. Henry L. Doherty, Manager of the Madison (Wis.) Gas and Electric Company, and introduced to the gas profession under their joint auspices. The oxide was not spread in a horizontal layer, but placed for the most part in two vertical beds separated by a long and narrow vertical outlet "cage," built within, and a little smaller than, the box itself; leaving a gas space about 4 inches wide all round. Gas also filled the space between the top of the oxide and the top of the box. The cage was of wooden framework, and consisted of a series of upright shutters placed edge to edge in contact with each other; each shutter being made of two vertical timbers, about 3 feet apart, between which were nailed horizontal fixed "slats" sloping downwardly and inwardly towards the oxide, so that the latter fell freely upon them by gravity when the box was being emptied. The slats were so inclined and spaced as to prevent the oxide from falling out of the retaining cage into the space surrounding it, while at the same time presenting a maximum area of oxide surface for the admission of gas. This, briefly put, was the general arrangement of the apparatus brought forward by Mr. Butterworth; and it was fully described and illustrated in the "JOURNAL" for the 26th of April last (p. 943). It is referred to here for the purpose of introducing another appliance of similar character which was submitted by Dr. E. Merz, of Cassel, to the members of the Association of Gas and Water Engineers of the Middle Rhenish Provinces on the occasion of their meeting at Kaiserslautern.

In considering the question of purification, Dr. Merz was led to agree with the conclusions arrived at by Herr Kunath, that the working capacity of a set of purifiers does not depend upon the number of boxes in use or upon the thickness of the layers of material, but solely upon the extent to which the surface of the material is attacked by the gas. In purifiers as generally arranged, Dr. Merz calculates that this is only 25 per cent. of the total surface; the other 75 per cent. being required to support the material. Moreover, the gas in passing through the grids, is divided up, so to speak, into streams, the material between which, though not inactive as a purifying agent, is less efficacious than that which is directly in the path of the gas, unobstructed by the woodwork of the grid. Evidence of this is afforded in practice. When the material is removed from the box, it is found not to possess the same homogeneity throughout; proving that all its parts have not been in contact with an equal quantity of gas. The conclusion Dr. Merz drew from this was that if it were possible to bring into direct contact with the current of gas the entire surface of the purifying material, every particle of it would become equally active, and consequently it would be utilized in a more rational way.

Having arrived at this conclusion, Dr. Merz proceeded to show how the desired result could be attained. He pointed out that the utilization of the whole surface of the purifying material may be effected in two ways. The first method consists in making the grid of such a shape that the total area of the openings through which the gas passes into the material is equal to the base of the purifier. A grid of the kind indicated is shown in the accompanying diagram (fig. 1). It is constructed on the principle

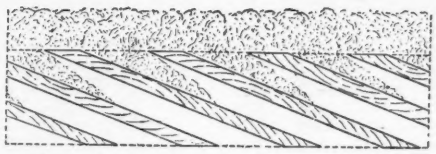


FIG. 1.

of the Venetian blind; and as the angle of inclination of the blades is less than the angle of repose of the material, the latter cannot run down them to the bottom of the box. The second method is to make the gas enter the box at the top, under the lid, traverse the material from top to bottom, and pass out beneath the supports of the lowest grid. This would, of course, necessitate the alteration of the inlet and outlet orifices in most purifiers; but this could be done in a day or two. The original grids could still be employed. By each of the methods indicated, the desired end—viz., the utilization of the entire surface of the purifying material—may be attained; and Dr. Merz says that by their adoption better pressure and greater efficiency will be secured than with the system generally in use.

In many gas-works, it is necessary to charge the purifiers from 100 to 300 times in the course of the year; whereas, according to Dr. Merz, with gas which has been well cooled and washed, this operation is required only from 25 to 30 times where there is an adequate surface of purifying material. Works where the smaller number of charges is required only suffer from insufficiency of purifier surface; and in these the two methods of charging already described are not very helpful. The question,

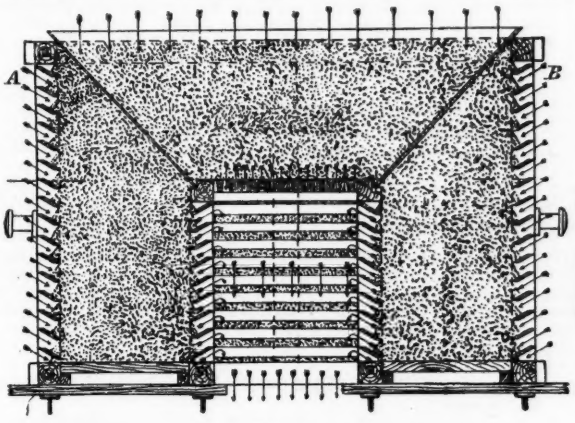


FIG. 2.

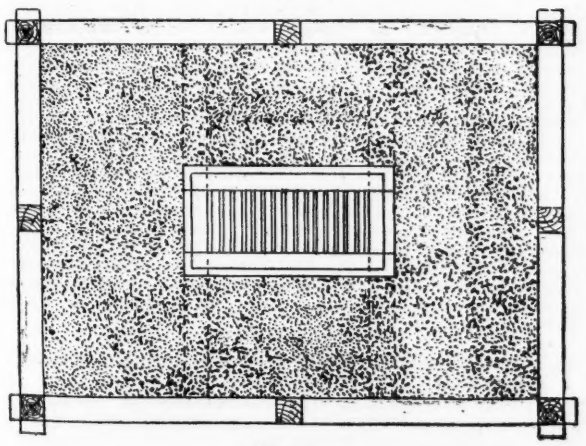


FIG. 3.

therefore, will be whether it will not be possible to get more work out of the existing plant. In order to do this, the box should be charged in a special way. We will suppose the purifier surface to be 20 feet square, the height of the box 3 ft. 6 in., and the gas entering at the top. If there is placed in the box a cage or frame constructed of upright and ordinary grids, as shown in figs. 2 and 3 (the latter being a horizontal section on the centre line in fig. 2), and so charged with purifying material as to form, with the four intermediate walls A B, a special upper layer, four lower ones being formed by the sides of the box, it is clear that the gas arriving from above and laterally will encounter a much greater surface than that presented by the simple base of the box. Taking only the average between the exterior and interior surfaces as being really efficacious, there will be 45 per cent. more surface by this arrangement than that directly presented by the purifier. To raise the duty by 100 per cent., all that is needed is to increase by about 1 ft. 9 in. the sides of the purifier. Fig. 4 shows the frame in the box.

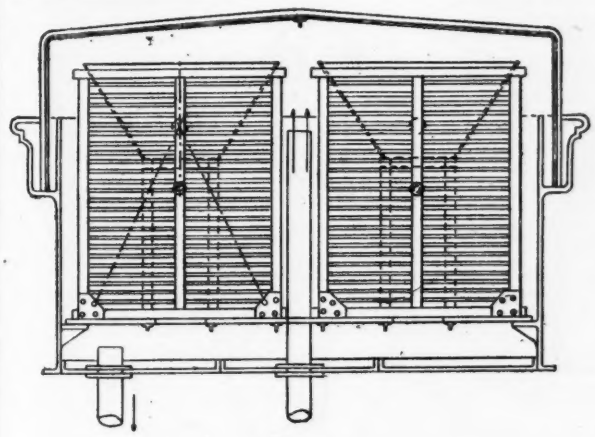


FIG. 4.

A question which arises in considering this subject is the possibility of performing, by a more simple method than that at present employed, the operations of filling and emptying the purifiers. When adopting the appliances above described, Dr. Merz says it is possible to economize time and labour by arranging them so that they can be raised bodily from the boxes with the material they contain, and be conveyed to the revivifying-shed. Reserve frames, ready filled, can in like manner be placed in the boxes. Moreover, instead of three or four purifiers being placed one after the other, two or three will suffice. The revivifying-shed need not be of greater area than that of two purifiers. If by employing these interchangeable frames the number of purifiers can be reduced, it will be necessary that their superficial area should be ample. Dr. Merz has found, in practice, that with a maximum production of about 883,000 cubic feet of gas per day, a purifier surface of 387 square feet is sufficient. He claims that, with his arrangement, the work of the purifier-house will be so simplified that it can be performed by ordinary yardmen.

A Congress of Calcium Carbide and Acetylene Gas Specialists was held at Frankfort-on-the-Main on the 27th and 28th ult., under the presidency of Professor Dr. Martin Freund. Among the papers read were the following: "The Chemistry of Acetylene," by Professor Dr. Erdmann; "A New Electric Furnace," by Dr. O. Froelich; "The Purification of Acetylene," by Dr. P. Wolff; and "The Position of Fire Insurance Companies in respect of Acetylene Lighting," by Herr J. Knappich. We hope to notice the proceedings more fully in a subsequent issue.

The Composition and Technical Analysis of Water Gas.—A correspondent has called our attention to two misprints in the article on the above subject in the "JOURNAL" for the 27th ult. The first occurs at the top of the right-hand column on p. 696, where

$$C_nH_m\left(n+\frac{m}{4}\right)O_2 \text{ is given for } C_nH_m+\left(n+\frac{m}{4}\right)O_2$$

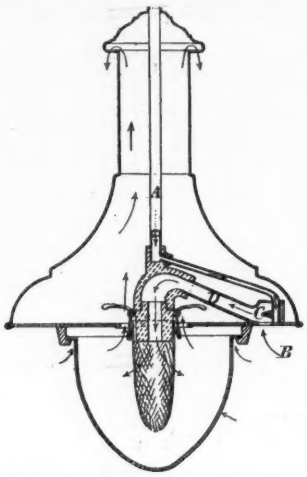
The second is in the table showing the calculation of the heating value of 1 cubic foot of water gas, at the foot of the left-hand column on p. 697. The figures commencing the second line of the table should be 0·1170.

The Disposal of Gas Liquor in Small Works.—The report on the working in the past year of the gas undertaking at Rixdorf, near Berlin, contains an interesting account of a profitable disposal of gas liquor. The works have an annual make of about 70 million cubic feet of gas; and the manufacture of sulphate appeared to be too elaborate a process to be undertaken on the spot for the comparatively small quantity of liquor which such a works produces. In place of sulphate, which contains about 25 per cent. of ammonia, a concentrated liquor containing on an average 22·52 per cent. of ammonia has been produced. This liquor has been obtained by passing the richly ammoniacal vapours direct to a so-called carbonic acid washer, in which carbonic acid is absorbed by lime. The removal of the carbonic acid in this apparatus permits the concentration of the liquor to proceed until it contains even as much as 25 per cent. of ammonia. The customary separation of crystals does not occur when the carbonic acid has been previously removed. The concentrated liquor at Rixdorf met with a ready sale, as the freight charges were relatively low in comparison with its strength. Its manufacture was a source of considerable profit to the works.

REGISTER OF PATENTS.

Inverted Regenerative Incandescent Gas-Light.—Kent, H. A., of Bowes Park, N. No. 20,823; Sept. 10, 1897.

This arrangement (as shown) is a combination of a Wenham and incandescent mantle light, and is an improvement on patent No. 3667 of 1897. The patentee describes the burner as consisting of one or more tubes of metal, fitted on to a smaller tube or jet for the admission of gas, with slots, holes, or the like in the larger tube, for the admission of air. The

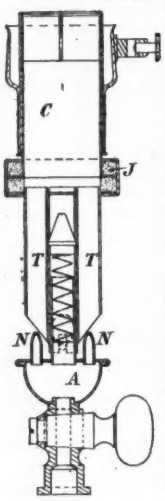


tubes are arranged on the top of a plate of metal having a hole in its centre, through which projects the end of the burner. This is made of steatite or any fire-resisting material; and on to it is fastened, by clips actuated by gravity or spring, the light-giving medium. The tubes are covered by a chimney or cone of metal, to the underside of which is attached a semi-circular shaped glass.

In the engraving, A represents the gas-inlet; B, the air-inlet; C, the gas-jet; and D, the mixing-tube for the gas and air.

Bunsen Burners.—Bishop, H. S., and Salmon, C., of Erith. No. 21,790; Sept. 23, 1897.

This burner is formed with a number of small gas-nipples N, arranged in a ring, and drawing their supply of gas from a common reservoir A of cup-shaped form, with a flat top. Standing immediately over each nipple is a small draught-tube T, shaped at the lower end to facilitate the air admission, and of "size and length relative to the opening in the gas-nipple to admit just the right quantity of air necessary for combustion." The draught-tubes all terminate at their upper end in a common mixing chamber C, which is insulated from the heat of the draught-tubes at J, so that the heat generated at the upper part of the burners, and necessarily communicated to the walls of the mixing chamber, is not communicated to the draught-tubes.



Referring to this feature of their invention, the patentees say: "By keeping the draught-tubes cool, the draught is not restricted or destroyed in a manner such as would take place with hot tubes, owing to the rapid expansion of the gases therein." They are thus "enabled to reduce the length and diameter of the draught-tubes to a minimum, which makes the burner much neater in appearance and more convenient for use."

To guard against the destruction of the mantles in situations subject to vibration, the burner is constructed so that the upper part, carrying the mantle, rests on a delicately adjusted spring.

Gas-Governor.—Milne, J., of Edinburgh. No. 23,264; Oct. 11, 1897.

Two forms of governor are described in the specification and illustrated by the drawings reproduced.

In the first (see fig. 1) the interior of the body of the governor A is divided by two cross walls into three chambers, the middle one of which is sub-divided into two by a longitudinal wall. Each of the two end chambers B is sub-divided into two by a horizontal wall, having an opening which forms a valve-seat C. The gas enters one of the sub-divisions of the centre chamber; and thence passes into the upper sub-division of one end chamber, and simultaneously into the lower sub-division of the other through openings in the cross walls. The gas then flows through the valves into the lower end chamber and upper end chamber respectively, and thence into the other sub-division of the central chamber, and is conveyed away by the ordinary main pipes. The valves (of any convenient type) are arranged to close on being lowered, and to open on being raised. They are supported by chains passing over pulleys to the top of a bell G placed in a tank above the body of the governor. The bell (being connected with the gas at the outlet of the governor by a small pipe with stopcock) is subjected to the various changes of outlet pressure, and so rises or falls—sealed by water placed in the tank shown. The ascent of the bell lowers the valves, and its descent raises them; thus decreasing or increasing the apertures through which the gas passes.

The effect of this arrangement of the valves, in conjunction with the manner of admitting the gas simultaneously to the lower sub-division of one end chamber and the upper sub-division of the other, is that, "whatever may be the suddenness or extent of any fluctuations in the inlet pressure, the valves are maintained in equilibrium—the gas tending equally to open the one and close the other."

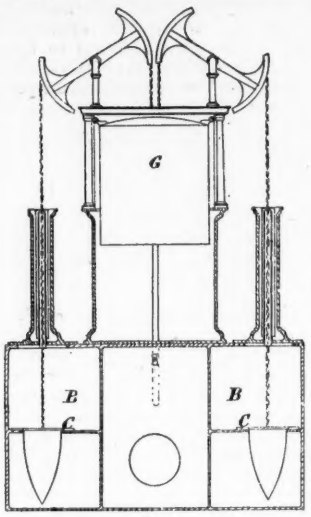


Fig. 1.

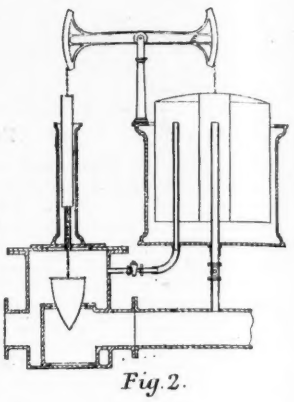
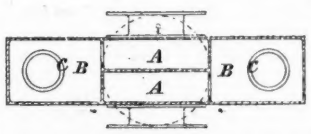


Fig. 2.



In fig. 2, the governor is made with the usual cone seat and cone, with its apex pendant from the lever or pulley, and connected therewith (from the ordinary water-slide chamber) by a rod or chain. The tank and bell, instead of being immediately over the cone, are placed to one side; and the bell is connected by means of a chain or band to the opposite end of the lever or wheel to which the cone is attached. Inside the bell, and fastened to the crown of it, is a compensating chamber open at the bottom, having its sides parallel to those of the bell, and its area equal to that of the opening in the valve-seat. The gas is admitted from the inlet side of the governor to the inside of this chamber by a tube rising above the water-line; and a pipe is carried between the outer side of the bell and the outlet side of the governor by which the outlet pressure is brought to bear upon the under side of the bell. Each of these pipes is fitted with a conveniently accessible stopcock.

The effect of this arrangement of cone-valve—in conjunction with the arrangement for admitting the gas simultaneously to the small chamber of the bell and the under side of the cone—is such, that, whatever may be the suddenness or extent of any fluctuation in the inlet pressure (as in the first instance), the valve is maintained in equilibrium; the gas tending equally to raise the bell on one side and thus depress the cone, and to raise it by its direct action.

Gas-Engines.—Hamilton, J. H., of Sandiacre, Derbyshire. No. 25,987; Nov. 9, 1897.

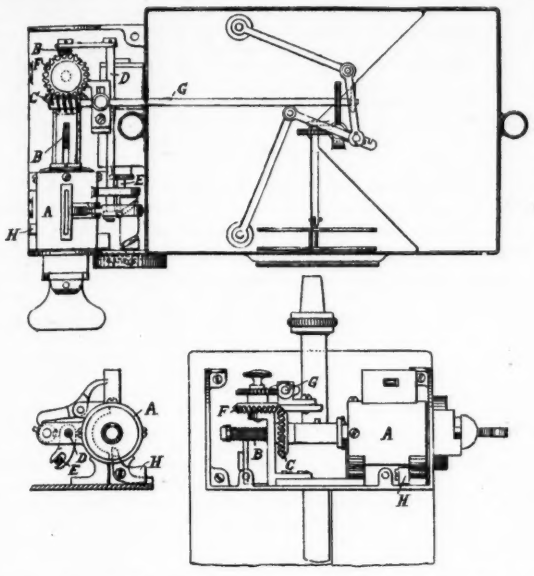
The patentee claims for his invention: (1) In a gas-engine of the four-stroke type, a special arrangement of admission, exhaust, and timing valves; the last named being normally held against its seat by a spring, but opened at the right time for ignition by a small lever pivoted to its outer guide. To the other end of the lever is pivoted a light rod, with a catch formed upon it, which engages with the top of the lever that operates the admission and gas valves. (2) A shaft governor consisting of a weight (or weights) pivoted to the fly-wheel, or other part fixed to the crank-shaft, and arranged so that, when the speed of the engine is too high, the weights cause a bevelled surface to be interposed in the path of the push-plate that operates the gas-valve. (3) A special water-circulating arrangement for the engine piston. (4) A self-starting arrangement for gas-engines, in which he proposes to utilize the steam from the boiler of the gas-plant by fitting in a vertical cylinder a loose piston, and to the bottom end of the cylinder connecting steam and exhaust pipes; while to the top end are connected air and gas pipes. The gas-pipe is led from the engine to the starter, and on past the latter to some convenient point for blowing off bad or surplus gas; while at the engine end the gas-pipe is connected through a cock to the main gas supply, and also through a lift-valve to the engine cylinder.

Prepayment Gas-Meters.—Anderson, J., of Edinburgh. No. 26,369; Nov. 12, 1897.

The essence of this invention in coin-freed gas-meters is "the arrangement, in combination, of parallel moving spindles and screw-and-bevel gear for operating the gas-controlling valve."

A hollow spindle extends from the coin-turning barrel A, and through it works a screw-threaded spindle B with cross-head end and a pin projecting through a longitudinal slot in the hollow spindle. The spindle B works through the internal screw-threaded boss of a bevel wheel C mounted on it; and in the forward motion of B, the wheel C is prevented from turning by connected wheel gearing. A spindle D is mounted parallel to the screw spindle; and the forked end of a radial arm from it embraces the disc end of the spindle B, so that, when the latter is turned and made to traverse forward, the parallel spindle D is given a corresponding extent of longitudinal movement. The forked end of an arm at its opposite end embraces the spindle E of the gas-controlling

valve, so that the valve receives corresponding motions. A projecting pin from this arm or from the spindle, works in a spiral slot or groove formed on the barrel of a parallel spindle, on which is mounted a pointer that works over a dial in front of the meter-case, to indicate the number of coins for which prepaid gas has to be vended; and a projecting pin on the barrel is made to tilt a lever, so as to close the coin-depositing slot when the maximum number of coins have been deposited at a time for prepaid gas. A bevel wheel F, mounted on a vertical spindle, gears with the wheel C; and an adjustable spur-wheel on the spindle gears into a screw worm on a horizontal spindle G, from which ordinary gear connec-



tions are taken to the counting mechanism of the meter. A bell crank or tilting lever H is fitted from below the coin-operated barrel to keep coin in position, and permit of varying thicknesses of coin operating the barrel.

As prepaid gas is consumed, the ordinary mechanism operates the bevel wheel C; and the parallel spindle D is traversed in the opposite direction to that given by the insertion of a coin. Thus when all the prepaid gas has been consumed, the gas-controlling valve is automatically closed—the spindle E being always moved in one direction while coins are being inserted, and in the opposite direction through the worm and bevel gear while gas is being consumed.

Incandescent Gas Mantle Support.—Brogden, G., of South Shields. No. 26,745; Nov. 16, 1897.

Instead of suspending the mantle by a small loop as usual, the patentee proposes to provide the mantle-supporting rod or post at its upper end with a perforated disc of convex or other suitable form, upon which the mantle rests, and is evenly and steadily supported—"it does not swing about; thus causing it to give a better light, and to be more lasting."

Acetylene Generators.—British Acetylene Gas Generator Company, Ltd., and Spence, H. K., of Kirkcaldy. No. 14,432; June 30, 1898.

This invention is a modification of, or addition to, the apparatus described in patent No. 29,554 of 1896; and it has for its primary object to provide more simple and efficient means for bringing the carbide chambers into action one after the other upon the exhaustion of the material therein, "whereby the generation of the gas can be performed automatically after the generator has been once started." It has also for its object to improve the construction of the water-valves and pipes supplying the carbide chambers.

APPLICATIONS FOR LETTERS PATENT.

20,766.—Forrester, W., "Acetylene gas generator." Oct. 3.
20,837.—Smith, A. G., "Acetylene gas generators." Oct. 4.
20,842.—Streubel, A., "Gas-cocks for street-lamps." Oct. 4.
20,851.—Ginder, W. J., "Acetylene lamps or generators." Oct. 4.
20,936.—Wiltshire, G., "Producing acetylene gas." Oct. 5.
20,965.—Lisle, H., "Gas or other stoves." Oct. 5.
20,984.—Spooner, A. F., "Gas-burners." A communication from La Société J. Lacroix et Cie. Oct. 5.
20,995.—Colberg, H., Thompson, A., and Lion, J., "Generating acetylene gas." Oct. 5.
20,996.—Lake, H. H., "Production of acetylene gas." A communication from R. Türr. Oct. 5.
21,034.—Martin, P. A., "Acetylene lamps or generators." Oct. 6.
21,038.—M'Conechy, J., "Production of acetylene gas." Oct. 6.
21,054.—Wœrn, C., "Lighting or extinguishing street and other gas-lights." A communication from O. Ljungstrom. Oct. 6.
21,067.—Brown, F., "Production of oxygen gas." Oct. 6.
21,069.—Schad, E., "Acetylene-lamps." Oct. 6.
21,112.—Kitchen, J. G. A., "Oil or gas generating burners." Oct. 7.
21,187.—Fletcher, T., Russell, W., and Fletcher, Russell, and Co., Ltd., "Gas cooking-apparatus." Oct. 8.
21,197.—Bray, G., "Gas-burners." Oct. 8.
21,242.—Troubel, S., "Acetylene gas generators." Oct. 8.

The Carlisle Corporation Water Act, passed last session, involved an outlay of no less than £4415 5s. 6d.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

Extension of Workmen's Breakfast Time.

Sir,—Allow me to draw the attention of your readers to an amelioration of the lot of working men that costs the employer but little compared with the benefit conferred.

During the discussion that accompanied the strike of the engineers last year for an eight-hour day, it was said that it was a hardship to require a man to go to work at six o'clock and wait two hours for his breakfast at eight o'clock; and that it would be better to have breakfast before going to work. This, of course, was all nonsense; for experience shows that two hours' work or exercise before breakfast gives a wholesome appetite for the meal. It, however, occurred to me—and I blame myself for never thinking of it before—that when breakfast-time comes, with the healthy appetite produced by labour or exercise, it is essential that time should be given to make a comfortable meal. For this, half an hour is certainly not enough in the majority of cases. Of course, I said nothing while the strike of the engineers lasted; but at its close the question was discussed, and the resolution was adopted to increase the breakfast-time for all yard labourers and mechanics, and all other men except those engaged in the retort-houses, from half to three-quarters of an hour, of course without reduction of pay. This was done about four months ago; and I have never known any concession to workmen give so much satisfaction. Moreover, the Company do not lose the whole fifteen minutes, because there is now no necessity for the men to begin preparing for breakfast some minutes before the bell rings. The result has been so good all round, that last Saturday the Crystal Palace District Gas Company followed the example of their neighbours, with equal satisfaction to their men. For a workman to be able to get a comfortable breakfast at eight o'clock with his wife and family, is far better than to require him to breakfast before going to work, as is necessary under the eight-hour system.

George Livesey.

South Metropolitan Gas Company, Oct. 17, 1898.

The Suggested Reserve Force of Gas Stokers.

Sir,—I thank you for your article in the last issue of the "Journal" on "A Suggested Reserve Force of Gas Stokers."

First let me say I made the suggestion, believing that "prevention is better than cure," and that if gas-workers knew their employers had a strong federation at their back, there would be few strikes, and managers would go through the winter season much more comfortably.

If the gas-works federating would agree to subscribe each year (say) half-a-crown per million cubic feet of gas made, this would, in my opinion, more than cover the expenses.

A Secretary should be appointed, who would keep in touch with labour questions, and be able in the event of trouble at any of the federated works to advise the manager as to finding men, and the better means of providing huts, beds, food, &c.

The men could be obtained several ways—say by each subscriber agreeing to find and send, as and when called upon, one man for every fifty millions of gas he makes annually. There would be no difficulty in having a private agreement with several men—say, by giving them an extra shilling a week—to be ready for this duty. Of course, they would be allowed to return if they wish when the trouble is over. Or if the manager preferred not to interfere with his own men, surely it would be easy enough to find free labourers out of work to this small number in each town; or, alternatively, by the Federation paying a lump sum each year to the Free Labour Association, of London, or to Mr. Græme Hunter, of Manchester, or any other Free Labour leader, who would enter into a contract to provide a certain number of competent men at a day's notice.

The Council of the Federation should be empowered to make a grant to any company having fought a strike, of (say) one-half of the cost of such strike—this from existing funds or by making a levy.

The Federation should keep a gang of old soldiers or policemen, to act as pickets at each works when a dispute is on, so as to protect any free men when applying for, or going to or from, work. I attach particular importance to this suggestion, because I am sure if proper protection were afforded, no unjust strike would succeed.

One does not desire to take any unfair advantage of one's workmen; but the unreasonable demands of the respective Unions among the men caused the successful formation of the Shipping Federation, the Masters' Combinations of Engineers and of Coal Owners, and the Gas Makers' Union must eventually cause "The Gas-Works Federation," or the joining of the larger Federation of Capital mentioned in your article.

Midlands.

Oct. 13, 1898.

Sir,—In one of the "Editorial Notes" in last week's issue of the "Journal," reference is made to a suggestion for the formation of a "reserve force" of skilled gas-works stokers, ready to be called upon at a moment's notice in case of a strike. No doubt this refers to horizontal retorts, charged by hand. I take the liberty of mentioning the fact that there would be no necessity for the "reserve" wherever inclined retorts are adopted, as the labour required is entirely of an unskilled nature; and it is found advisable not to engage skilled stokers who have become used to shovel charging—the best man for the job being the smart, handy labourer.

Maurice Graham.

Leeds, Oct. 14, 1898.

Amalgamation of the London Water Companies.

Sir,—Recent events indicate unmistakably the wisdom of the unity among the London Water Companies which is strength. Amalgamation in the case of gas has been fruitful in good results; and, analogously, similar benefits would accrue to water. Uniformity in administration, coupling up all the distributory apparatus, utilizing surplus water storage, assessments, ratings, and many other matters, could be more easily dealt with under one directorate than many. To delay the matter is to court defeat and favour the chronic agitator whose "little knowledge is a dangerous thing" in the way of mischief-making.

It is an historical fact that when a great work has to be done, this

country has usually produced the necessary power at the right moment, and done it. In this case, the means are existent; but where is the man to ensure this consummation? Will he not step to the front in the hour of need? It is time to "limber up, the enemy is upon us."

A propos of the unprecedented rain-famine which has afflicted Central England and the Eastern Counties for many years, and the assertion of the before-mentioned "chronics" that "there has been no drought" within the meaning of section 3 of the Water-Works Clauses Act, 1863, or section 15 of the Metropolis Water Act, 1871, I beg to enclose a copy of my rainfall register kept at Leyton, by which it will be observed that the rainfall has been less than 9 inches in nine months. This is an instructive and interesting fact to make a note of, whether viewed in connection with river and canal navigation or water supply, whether by gravitation works, surface springs, subterranean reservoirs, or other sources, inasmuch as the record is some 50 per cent. below the average, and therefore phenomenal, even for this dry district.

C. E. Jones.

Lea Bridge Road, Leyton, Oct. 12, 1898.

[Enclosure.]

Rainfall at Leyton, Essex, in 1898.

[Rain Gauge.—Diameter of Funnel, 5 inches; Height of Top above Ground, 1 foot.]

Month.	Total Depth.	Greatest Fall in 24 Hours.		Number of Days on which 0·01 inch or More Fell.
	Inches.	Depth.	Date.	
Jan.	0·53	0·21	5	6
Feb.	0·86	0·16	5 & 26	12
March.	1·04	0·42	26	10
April	1·06	0·31	27	9
May	1·93	0·37	19	18
June	1·10	0·30	27	13
July	0·75	0·24	22	5
Aug.	1·01	0·68	7	10
Sept.	0·40	0·31	29	3
Total	8·68	..	..	86

An Unsuspected Cause of Waste of Water.

Sir,—The scarcity of water, not only in East London, but also in various parts of the country, owing to the extraordinary drought which has prevailed, makes the question of waste at the present time of unusual importance to all water authorities. I venture to point out what, in my opinion, is the greatest existing cause of useless expenditure of water.

Of recent years, it has been the custom, in all moderate-sized or even small houses, to construct bath-rooms and lavatories with hot and cold supply. These are, in most cases, fed from a hot-water cistern in the scullery. When the fire is made up for cooking the dinner, this cistern begins to roar and shake; and the vibration is felt more or less all over the house. The cook, if inexperienced in life on a screw steamer, where similar noises are often heard, is much alarmed, and informs the neighbouring servants of the danger which she thinks exists. They laugh at her ignorance, and seem surprised to find that she does not know it is necessary to turn on the hot-water tap at the sink, and allow the water to run to waste whenever there is a large fire in the kitchen. She adopts the idea and "lives happy ever after." This is no exaggeration; and I feel sure if any water authorities finding an excessive consumption of water in their districts will take the trouble to make private inquiries, they will learn that the practice I have alluded to very generally prevails.

The questions discussed of recent years with regard to two, three, or five gallon flushes are mere idle talk, as regards the quantity of water affected by them, when compared with the construction of the hot-water supply in modern villas.

A. K. B.

Oct. 15, 1898.

LEGAL INTELLIGENCE.

Unlawful Use of Water at Kingsgate.

At the Cinque Ports Petty Sessions, held at Margate, on the 3rd inst., before Mr. E. S. Wootton (Chairman) and Captain C. T. Hatfield, Mr. A. Kay, of Little Holland House, Kingsgate, was summoned on the information of Mr. W. J. Latchford, Manager of the Broadstairs Gas and Water Company, for having, between the 27th of July and the 25th of August, unlawfully used a portion of the water supply of the Company for the purpose of watering his lawn and garden. Mr. J. Emery appeared in support of the charge; Mr. Shea represented the defendant, who pleaded "Not guilty." Mr. Emery said the proceedings were taken under the 18th section of the Water-Works Clauses Act, 1863 (incorporated with the Broadstairs Water-Works Act), which prohibited a person having a supply of water for domestic purposes from using it in other ways. In the present case, the defendant had water for his house, and also for a horse and carriage; but he had not contracted for a supply for his garden, and he was summoned for using water for it. It was alleged that some five years ago he received permission from Mr. Skinner, who was then collector to the Company, to use the water for the garden without paying for it. Since the summons was issued, he had called upon Mr. Skinner and asked him if he remembered giving him such permission; and he informed defendant that he had never done so, either to him or to anyone else. Defendant then said he must have been mistaken. Mr. Latchford put in a minute passed by the Directors authorizing him to take the present proceedings. In answer to the Chairman, he said the charge for a horse was 6s. and for a carriage 8s.; but there was no fixed charge for a garden hose. Application had to be made to the Company; whereupon the garden was inspected, and the charge fixed according to its size—it might be £2, £5, £10, or even more. In this case the charge would have been at least £2. Even these charges did not pay for the water used. Mr. Skinner was called, and denied having given the permission stated. Mr. Shea remarked that the defendant was partner in a large firm of South African merchants, and was not the kind of gentleman who, for the sake of £2, or even £200, would attempt to use the water supplied by the Company without paying for it, did he not believe that he had a perfect right to do so. He was apparently under a wrong impression as to his interview with Mr. Skinner some four or five years ago; but he certainly thought permission had been given to him to use the water for his garden. The defendant had for five or six years paid for water for a horse and carriage; but for the past three years, if not more, they had not been down. Yet he had paid just the same; nothing being said about any rebate. Therefore he was simply using the water on his garden instead. His client never had any intention of avoiding payment for the water; and therefore he (Mr. Shea) asked the Magistrates to dismiss the case. It was suggested that a compromise might be effected on defendant paying for the water used; but no settlement was arrived at. Mr. Shea said he would not call any witnesses, but leave the matter in the hands of the Bench. After a short consultation, the Chairman said it was decided to fine defendant 1s., with £1 16s. 6d. expenses and 16s. 6d. Court fees.

A Point under the Workmen's Compensation Act.

At the Birmingham County Court last Wednesday, his Honour Judge Whitehorne was called upon to arbitrate between Richard T. Jones, a blacksmith, of Cranmore Street, Nechells, and Messrs. C. & W. Walker, of Donnington, Newport, as to the amount of compensation for injury to be paid to Jones. Mr. Parker appeared for the applicant; and Dr. Rogers for the respondents. The case was the first under the new Act heard in the Birmingham Court; and though there was no dispute as to the injury and the liability to pay compensation, a rather singular point arose. Jones had been employed as a blacksmith at the Standard Cycle Works, and earned from 32s. to 38s. per week; but he fell out of employment, and in search of other work called two or three times at Saltley Gas-Works, where the respondents are engaged erecting a new gasholder. Ultimately, on July 11, the foreman in charge of the work engaged him. He had only been at work an hour or two, however, when the accident happened. A hammer, which was being used by a workman, broke, and the head fell a distance of 50 feet on to Jones's back. The blow caused concussion of the nervous system and contusion of the dorsal muscles, and incapacitated him from work. He therefore claimed that he was entitled, as a blacksmith earning the wages mentioned, to an allowance of 16s. 9d. per week during his incapacity. He did not admit that he was merely engaged as a labourer, urging in support of his contention that he was not engaged on labourers' work at the time, and that after his injury 2s. 6d. was sent to him as wages. The defendants, on the other hand, contended that, though a blacksmith, Jones was engaged as a labourer to assist a mechanic who was fitting the guide-rails to the holder. The foreman, Monk, asserted that, when he engaged Jones, he told him that there were no blacksmiths' forges on the premises. The rate of wages was not mentioned, because there was a standard rate of 24s. for labourers. The half-crown which was sent to Jones did not represent the wages he had earned during the short period of his employment. His Honour said two questions were raised. Could they, in deciding the amount of wages which the applicant was entitled to receive, look back to some former employment, and could they infer the rate of wages from the terms of employment even though practically no wages had been earned. On the first point, he held that an applicant was not entitled to look back; for, if he were, a workman would always select a previous employment when he was earning higher wages. As to the second point, he did not think the Act intended a man to be excluded from benefit when he was injured while working under such circumstances as were disclosed in this case. He held that Jones was employed as a labourer; and the wages for that occupation being 24s. per week, the compensation would be 12s. per week. Dr. Rogers did not ask for costs; but he expressed the hope that, in not doing so, he would neither be establishing a precedent nor holding out an encouragement to workmen to "have a run for their money" in the belief that it would cost them nothing.

Use of Water by Fishmongers.

At the Ipswich Police Court last Thursday, Mr. W. H. Southgate, a fishmonger, was summoned for infringing the regulations of the Water Committee of the Ipswich Corporation. The Town Clerk (Mr. W. Bantoft) said Mr. Southgate was served with a notice on the 23rd of June, to the effect that the Council had determined that from and after Sept. 29, 1898, the supply of water to fishmongers would be by special agreement only in each case; and the fixed charge of 3s. per quarter, in addition to the domestic rate, was from that date abolished. Defendant was informed that, if he proposed to use any water in connection with his business after the 29th of September, it would be necessary to communicate with the Manager before the 1st of August. As the defendant did not take any notice of this communication, he was reminded of it; and on the 8th of October one of the inspectors found two men and a boy washing fish in his yard with the tap turned full on. Under these circumstances, the Corporation were bound to take proceedings. Mr. Hamlet Roberts, the Manager, said defendant told him he would not have a meter fixed at any cost. The defence was that a good price was being paid for the water. Defendant paid the rate for his own house and for the one adjoining, which was not occupied, and also an extra water-rate of 13s. a year which was put on him about fourteen years ago. A penalty of 20s. and 12s. costs was imposed.

The Supply of Gas in the Out-Districts of Bradford.—At last Tuesday's meeting of the Bradford City Council, on the recommendation of the Gas Committee, it was resolved to include in their next Bill in Parliament clauses for the purpose of authorizing the Corporation—(1) To purchase gas in bulk for the supply of districts in the existing or extended city lighted by private Companies, with a view to the equalization of the gas charges throughout the limits of the existing or extended city; (2) if deemed desirable, to purchase the distributing mains of private Gas Companies within the limits of the existing or extended city.

MISCELLANEOUS NEWS.

THE GAS QUESTION IN VIENNA.

Recent events in connection with the above question were recorded in the last number of the "JOURNAL." At the sitting of the Communal Council on Monday, the 11th inst., Dr. Lueger stated that he would lay before the Governor of Lower Austria the protest of the minority against the decision come to in the matter of the suburban contract of the Imperial Continental Gas Association. He would not, however, oppose the decision in question, as he held it to be perfectly valid. The following are the principal heads of the contract: The Association obtain a unified contract extending to Dec. 31, 1911, for the lighting of all the suburbs, with one exception, which is in the immediate vicinity of the new municipal gas-works; this being exchanged for parts for which they had no contract. At the expiration of the new contract, the Municipality will be compelled to take over the mains, meters, public lamps, &c., belonging to the Association at a valuation. There is also a stipulation that the prices charged for gas are not to be changed without the consent of both parties. Commenting on the question, the Vienna Correspondent of "The Times" says: "The result of this sample of anti-Semitic administration, so far as the city of Vienna is concerned, is this: Whereas the Corporation might have obtained the whole of the business and works of the English Company, without trouble or inconvenience, for £1,350,000, the town has been kept in a state of confusion, and serious loss has been inflicted upon the trading classes, by the putting down of new pipes, necessitating extensive excavations, interrupting traffic in the main thoroughfares, and disfiguring the city. It has been well-nigh fatal to tradespeople. It has kept strangers away from the place, and has caused a general outcry among the entire population. If all appearances are not deceptive, the anti-Semitic administration has been digging its own grave in the streets of the capital. A sum of £3,000,000, if not more, will be expended, and they are as yet only in possession of a portion of the lighting of the town. The agreement is treated by the entire Press, with the exception of the anti-Semitic organs, as a crushing defeat for Dr. Lueger and his party, and a complete victory for the English Company." Simultaneously with this victory comes the announcement by the Directors of the Association of a dividend of 5 per cent. for the half year ending the 30th of June.

BIRMINGHAM CORPORATION GAS SUPPLY.

Disqualification of the Chairman of the Gas Committee as a Burgess of Birmingham.

By a singular mischance, following closely upon the general feeling of satisfaction experienced by the members of the Corporation of Birmingham and the other gentlemen forming the party who visited the Saltley Gas-Works last Wednesday, as recorded in another part of the "JOURNAL," at the excellent position of the gas undertaking, a circumstance came to light which has deprived the City Council, at all events for a year, of the man to whose ability a good deal of the prosperity of the undertaking is due. It has been discovered that Alderman Pollack, the Chairman of the Gas Committee, has become ineligible for re-election as an Alderman next month, owing to his disqualification as a burgess. It appears that, upon the publication of the new burgess roll, it was found that Alderman Pollack's name did not appear thereon. Inquiry as to how such an omission could have occurred resulted in the discovery that some person in the Overseers' office had put the word "alien" against the Alderman's name in the rate-book, with the result that it was not included in the new list of voters submitted to the Revising Barrister. The omission was not observed by Alderman Pollack, nor by any of the agents of the political associations, or a claim would have been sent in on his behalf.

Referring to this unfortunate matter last Saturday, the "Birmingham Daily Gazette" said: "On Thursday the fact was not known outside a very small circle of officials, and hopes were still entertained that a *modus vivendi* might be discovered whereby the error could be rectified and Alderman Pollack's great services on behalf of the city of his adoption continued without interruption. Several consultations took place between the Town Clerk and representatives of the Overseers; but an examination of the authorities bearing upon the question made it perfectly clear that for twelve months Alderman Pollack will be unable to take any active part in municipal affairs within the City Council. The more the subject was discussed, the greater became the surprise that Alderman Pollack should be classed among the 'aliens,' and thereby disqualified from voting or associating himself with the active government of the city. He has been a naturalized Englishman for the last 45 years; and, in addition to being a ratepayer and an Alderman of the City Council, he has served as Mayor and is a Magistrate for the city. Although his omission from the register is recognized as an official error, it is absolutely impossible for it to be rectified until the voting lists for 1899 are compiled, for there is no Act of Parliament under which Alderman Pollack could appeal to the Higher Courts for the restitution of the rights of citizenship so unjustly taken from him. It was suggested that his invaluable services on the Gas Committee might be retained in the same way that the assistance of several gentlemen who are not members of the Council is secured on the Free Libraries and Museum and School of Art Committees; but this also is impossible under the provisions of the Municipal Corporations Acts. It is only in the cases of the Free Libraries, Museum, School of Art, and Technical Instruction Committees—which have Special Acts of Parliament—that gentlemen not members of the City Council can act. No one has rendered more loyal and self-sacrificing service to the city than Alderman Pollack; and we share with every inhabitant of Birmingham the regret that will be felt over his compulsory—though it is hoped only temporary—retirement from civic life."

We learn from the above-named source that Alderman Pollack has received numerous letters and personal expressions of sympathy in his unfortunate dilemma. It was only natural that he felt the position acutely—indeed, he was dumbfounded when the fact was first made known to him. He, however, fully recognized the hopelessness of the situation; and while regretting his enforced severance from the work in which he has for seventeen years taken so warm an interest, he has determined to make the best of it. If he was called upon at the end of another twelve months to resume office, and his health was continued, he would, he said, be prepared to place his services at the disposal of the city. Happily, all the work—and he spoke especially with regard to the Gas Committee—was well in hand; so that his successor in office would have no insuperable difficulties to face.

METROPOLIS GAS SUPPLY.

Dr. A. W. Williamson's Quarterly Report.

The following is an extract from the report of Dr. A. W. Williamson, F.R.S., the Chief Gas Examiner for the Metropolis, on the quality of the gas supplied to London during the quarter ended the 30th ult.:—

I. *Illuminating Power.*—The maximum, minimum, and average illuminating power, in standard sperm candles, of the gas at each of the testing-places was as follows:—

	Max.	Min.	Aver.
The Gaslight and Coke Company—			
Fenchurch Street, E.C.	17·4	15·9	16·6
Kinghorn Street, Cloth Fair	17·1	16·0	16·5
Dorset Buildings, E.C.	17·2	16·2	16·6
Millbank Street, S.W.	17·8	16·4	16·7
Ladbroke Grove, W.	17·5	15·8	16·5
Vincent Terrace, N.	17·2	16·0	16·4
Carlyle Square, Chelsea	16·5	16·0	16·1
Camden Street, N.W.	16·9	16·1	16·4
Graham Road, Dalston	17·3	16·0	16·6
Kingsland Road, E.	17·6	16·1	16·7
Spring Gardens, Charing Cross	16·9	16·0	16·4
Vinery Villas, St. John's Wood	16·9	15·8	16·2
Lambeth Road, S.E.	16·8	14·5	16·3
Hornsey Road, N.	17·3	15·8	16·4
George Street, Hampstead	17·1	16·0	16·5
Commercial Gas Company—			
Wellclose Square, E.	17·2	16·0	16·2
Parnell Road, Old Ford	18·1	16·0	16·6
South Metropolitan Gas Company—			
Hill Street, Peckham	18·0	15·9	16·8
Bedford Road, Clapham	17·8	16·0	16·7
Stoney Lane, Tooley Street	17·5	16·1	16·6
Lewisham Road, S.E.	17·5	16·0	16·4
Blackfriars Road, S.E.	17·5	16·0	16·6
Burrage Road, S.E.	16·9	15·6	16·3

It will be seen from these results that the average illuminating power of the gas at all the testing-stations has been higher than the parliamentary standard of 16 candles.

II. *Purity.*—Sulphuretted hydrogen has not been present in the gas at any of the testing-stations. The proportions of sulphur in other forms than this were as follows:—

	Max.	Min.	Aver.
The Gaslight and Coke Company—			
Fenchurch Street	13·9	7·6	10·5
Kinghorn Street	16·2	9·2	11·7
Dorset Buildings	12·6	7·6	9·8
Millbank Street	13·4	6·0	8·2
Ladbroke Grove	13·5	9·4	11·3
Vincent Terrace	19·4	9·9	13·5
Carlyle Square	16·4	9·4	11·7
Camden Street	13·7	8·5	11·4
Graham Road	11·4	9·2	10·1
Kingsland Road	13·3	7·8	10·7
Spring Gardens	13·6	6·3	10·2
Vinery Villas	14·6	8·9	11·6
Lambeth Road	16·2	7·3	9·3
Hornsey Road	17·02	7·3	10·9
George Street	17·0	8·6	12·3
Commercial Gas Company—			
Wellclose Square	10·1	6·4	8·3
Parnell Road	15·2	3·0	8·2
South Metropolitan Gas Company—			
Hill Street	12·2	6·9	9·0
Bedford Road	12·8	7·9	10·1
Stoney Lane	15·2	6·9	10·3
Lewisham Road	14·8	7·0	10·3
Blackfriars Road	13·6	5·7	9·2
Burrage Road	12·4	5·1	10·6

The average amount of sulphur present in the gas at all the testing-stations has been considerably less than the quantity permitted—viz., 17 grains.

EXPERIENCE OF MUNICIPALIZATION AT KENDAL.

The Falmouth Gas and Water Purchase Committee intend placing in the hands of the ratepayers a communication from Alderman John Monkhouse, the ex-Mayor of Kendal, giving that borough's experience of the municipalization of the gas and water works. The writer's argument is that what has been done at Kendal and elsewhere might be accomplished at Falmouth. The figures which he gives relating to Kendal are certainly interesting; and there is no doubt that much of the credit for the good results quoted must be ascribed to the management of the Engineer and Secretary (Mr. T. N. Ritson). Alderman Monkhouse states that £80,350 was paid for the joint undertaking, and the mortgage debt of £4500 was taken over. The purchase was ratified by Parliament in 1894; and during the three and a half years ending March last, there has been a surplus profit of £1000 a year—that is after paying £1668 interest and £638 to the sinking fund, together with all charges for maintenance of works, &c. In addition to this, the meter-rents have been abolished,

which is equal to a loss of £350 to the revenue. The price of gas has been reduced 3d. per 1000 cubic feet—a loss of £700 a year to the revenue—together a remission of £1050 a year to the consumers. The surplus profits earned are equal to 5d. in the pound on the rateable value; and as soon as the reserve fund is considered ample (it is now about £3000), Alderman Monkhouse believes the profits will be applied to a reduction of the rates. He is confident they will be able to gradually reduce the price of gas, both for lighting, cooking, and motive power, and still make large surplus profits. The demand is so great that the Committee are now considering the question of erecting a new gasholder at a cost of £6000. At the same time, the Corporation are discussing the question of the introduction of the electric light. They believe there is room for both illuminants. There is a wide field for gas among the smaller houses for lighting and cooking, to which the Gas Committee deal liberally by giving ring burners and stoves for cooking, and by putting in slot meters and fittings free. The output of gas at the date of the transfer was about 40 millions; and last year it was 57 millions—a fact which, Alderman Monkhouse says, "ought to appeal strongly to those who are always croaking that gas has seen its best day."

ELECTRIC LIGHTING NOTES.

At last Wednesday's meeting of the Kidderminster Town Council, the corporate seal was affixed to the agreement for the sale to the British Electric Traction Company of the Kidderminster Electric Lighting Order, 1871.

The Electric Lighting Committee of the Walsall Town Council, at their meeting last week, recommended that the salary of the Electrical Engineer be increased from £200 to £300 a year, and that electric lamps be substituted for the incandescent gas-lamps in certain parts of the borough, at a cost of £188. They also recommended, and it was agreed, that a sum of £400 be included in the next borough rate estimate to cover the loss on the Electric Lighting Department.

The Tunbridge Wells Town Council some time ago decided to extend their electric lighting works, for which purpose they are now seeking power to raise a further loan of £25,000. The capital already sunk in the venture is of modest proportions; the total being £15,000. This, according to information recently laid before a Local Government Board Inspector (Mr. Dandford Fawcett), has enabled the authorities to secure a net profit on the past year's working of £1348. In 1896-97 the surplus was £890; while in the preceding seven months £757 was derived from the enterprise.

At the meeting of the Bradford City Council last Tuesday, an attempt was made to saddle the Tramways Committee with the cost of lighting—estimated at about £500 per annum—the new electric tramway routes out of the town, mainly, it would appear, on the ground that the Electricity Department has £11,000 in hand and the Gas Department £47,000. It was objected that the Corporation already supply light for about 8000 street-lamps free of specific charge to the public; and yet it was proposed that the first person or body to be charged should be the Tramways Committee. It was manifestly unjust to saddle the Tramways Committee with the expenditure, as they had nothing to do with the lighting of the streets. An amendment, to this effect, to the Finance and General Purposes Committee's report was thereupon put and carried.

The intimation of the Local Government Board to the Bury St. Edmund's Town Council that a modification of the scheme of electric lighting might find favour in their eyes has been under the consideration of the Electric Lighting Committee; and they curtailed their proposals to such an extent that a loan of £16,000 would suffice to carry it out. In the meantime, offers were received from electric lighting companies to take over the Provisional Order; but such a course was not acceptable to the Committee. Before introducing the modified scheme in open Council, it was brought before a meeting of the General Purposes Committee, who, seeing that the new proposal showed only a small saving in capital cost, decided to recommend the Council to appoint a deputation to wait on the Local Government Board, and urge them to consent to the original scheme, the cost of which is now estimated at £21,500—a further £1200 having been tacked on to the cost of the buildings. The Council last Tuesday adopted the recommendation of the General Purposes Committee; but it is doubtful whether the deputation will be more successful in softening the hearts of the Board than previous deputations from other towns have been.

A Local Government Board inquiry, conducted by Mr. W. A. Ducat, was held in the Shire Hall, Shrewsbury, last Friday, in reference to an application by the Corporation for sanction to a loan of £35,800 for the purchase of the undertaking of the Shropshire Electric Light and Power Company, and the subsequent extension of the works. Mr. H. C. Clarke, the Town Clerk, appeared for the Corporation; and Mr. Spearman, of the Oxford Circuit, for the Shrewsbury Gas Company. Mr. Clarke stated that the Electric Light Company obtained their powers in 1894, and in 1897 they were approached by the Corporation with a view to the purchase of the works. Messrs. Kinkaid, Waller, and Manville were accordingly called in; and it was agreed provisionally to pay £21,500 for the undertaking. If the works were purchased by the Corporation, it would be necessary to enlarge them; and for this purpose a provisional agreement had been entered into for the purchase of additional land at a cost of £800. Mr. Manville presented his report, and said the price was reasonable. Mr. Spearman cross-examined him to show that the speculation was a bad one for the ratepayers. He said that the price was excessive, and that the works were not paying at present. Mr. T. P. Deakin (Chairman of the Lighting Committee) said the lighting of the streets had been complained of for some years and at last negotiations were entered into for purchasing the works of the Electric Light Company, by which means they thought they would bring down the price of gas. The inquiry closed without any other opposition than that of the Gas Company.

There are a few points in a letter which has appeared in the Manchester Press on the subject of the electric lighting of Stretford which will bear a wider publication. The writer is Mr. Wilfrid L. Spence, M.Inst.C.E.; and the object of his letter was to dispel some of the misapprehensions which he thinks existed at the recent meeting of Stretford ratepayers (noticed last week), and which, in his opinion, were responsible for the passing of a resolution protesting against the action of the District Council in deciding to establish a system of electric supply, rather than receive current from the Manchester Corporation. He says that the Manchester charges for current are by no means the lowest in the kingdom. It might appear at first sight that a maximum charge of 5d. and a minimum of 1½d. is lower than Edinburgh's flat rate of 3½d., with discounts up to 25 per cent.; but this is not the case, for the average prices obtained are: Edinburgh, 3·50d.; Brighton, 3·77d.; Manchester, 3·81d.; the next lowest being Whitehaven, 3·94d. Therefore, although the Manchester charge is certainly low, it is only fractionally more favourable than that of Whitehaven, with but one-twentieth the output; and it is higher than at Brighton, where fuel costs £1 per ton. The second misapprehension is that it would be impossible for Stretford to afford a self-supporting supply at an average price of 4d. per unit. The costs of generation at Manchester, as in several other towns, are rising instead of falling. The 0·94d. of 1896-7 became 1·11d. in 1897-8—a rise of 18 per cent.; and thus, although it is extremely unlikely, there is still a possibility that the charges in subsequent years will have to be raised in Stretford, unless, of course, the citizens are willing to increase their municipal burdens to relieve the lighting charges on suburban consumers. If the supposed supply scheme at Stretford were to be dependent solely on a lighting demand, it might be admitted that not for several years—say, three or four—could the system be made self-supporting at 4d. per unit. But with the immediate prospect of a large and constant demand for current to work the trams, there can, in Mr. Spence's judgment, be no reasonable doubt that, with a well-arranged plant, current sold at 4d. to lighting consumers would pay costs with interest and sinking fund from the very outset. Mr. Spence, who disclaims holding a brief for Stretford, concludes by asserting that the terms proffered by Manchester are such as no self-respecting local authority should accept.

The proceedings at a Local Government Board inquiry at Bangor last Wednesday possess more than ordinary interest for our readers. It had reference to an application for sanction to borrow £13,500 for an electric lighting installation; and one of the blessings which it is expected it will confer is "the relief of the strain upon the gas-works." Whether any evidence was adduced to show that the electric lighting scheme will be the cheapest way of relieving that strain does not appear in the report before us. The case for the Council was stated by Mr. J. A. Rodway, the Deputy Town Clerk. He first briefly outlined the course which the Council had pursued since 1890 to the present time to cope with the deficient storage capacity at the gas-works. Reports had been obtained from Mr. Thomas Newbigging, Mr. W. Foster (Nelson), and the late Mr. Robert Hunter (Chester); and the recommendations contained in the joint report of the two latter had been adopted. The electric lighting scheme which it was proposed to carry out was recommended by Mr. Medhurst; and the plant at the generating station would be equal to 4000 8-candle power lamps. The effect of the installation upon the gas-works would not be to decrease the consumption of gas, but it would stop the increase; and thus relieve the strain upon the gas-works. The proposed charge for the electricity was 6d. per unit. Mr. J. Smith, the Gas Manager, stated that the present storage capacity at the gas-works was 100,000 cubic feet; but the maximum consumption had in one day reached 223,000 cubic feet. With the new gasholder about to be erected, the storage would be increased to 180,000 cubic feet. Mr. Grey Edwards, the Chairman of the Lighting Committee, said that more than 100 of the principal ratepayers had promised to take the electric light; and these he estimated would require 3000 lights. To meet any possible deficiency on the works, a bond had been signed by about 60 persons, including tradespeople, professional gentlemen, and others, guaranteeing the sums set respectively opposite their names for five years. The total of the guarantee amounted to upwards of £650 per annum. The obtaining of this bond was the reason why the Council ultimately became unanimous upon the electric lighting question. In reply to the Inspector (Mr. W. O. E. Meade-King), Mr. Medhurst stated that electricity at 6d. per unit was equivalent to gas at 3s. per 1000 cubic feet. The opposition was represented by Mr. David Owen, who maintained that the electric light would be certain to affect the gas-works, which were the property of the town, and were very heavily encumbered. It was admitted that £3500 must be spent upon the gas-works to increase the storage capacity; and the opponents contended that this should be done first so that the town could have a little time to recover from its present financial position. Further evidence was also given.

Heywood Gas Supply.—The Gas Committee reported at the meeting of the Heywood Town Council last Thursday that the Local Government Board had sanctioned the borrowing of £8000 for the purposes of the gas undertaking.

Threatened Strike of Gas Stokers at Yeadon.—The stokers in the employ of the Yeadon and Guiseley Gas Company recently asked for an advance of 3s. per week and the engagement of a "wheeler on," and they gave notice that, if their request is not complied with, they would cease work yesterday. The Directors offered to pay the same rate of wages paid by similar gas companies using the same kind of retorts; but this proposal was declined by the men.

Advance in Stokers' Wages in the London District.—Last week the South Metropolitan and Crystal Palace Gas Companies resolved, on the ground that general labourers' wages, from which class stokers are drawn, have increased so considerably in the last ten years, to increase the wages of stokers 5d. a day, making 6s. the wages for the eight-hour shift. It is made up thus: Wages were 5s. 4d., with 1s. 6d. a week as "good time" money. This has been commuted into 3d. a day; making 5s. 7d. The idea was to give an increase of 4d.; but this would have made the odd figure of 5s. 11d. The round sum of 6s. a day was therefore adopted. At the Crystal Palace Company, however, the Sunday pay has been reduced from double time for 16 hours, from 6 a.m. to 10 p.m., to the South Metropolitan level of time-and-a-half for twelve hours, from 6 a.m. to 6 p.m. Other retort-house men and those working on the two-shift system have had proportionate increases; the latter not in proportion to the time but to the work. The men not being under the influence of the Union, work well and fairly; and this consideration has largely influenced the Directors of both Companies in making the advance of wages. Both Companies announced the increases last Saturday.

METROPOLIS WATER SUPPLY.

Proposed Amendment of the Metropolis Water Act, 1871.

The agitation which has been going on in the East-end ever since the East London Water Company were compelled, owing to the continued dry weather, to restrict the supply of water in their district, has given rise to pretty freely expressed opinions that some kind of legislation should take place with the view, if possible, of preventing a recurrence of the trouble now experienced. It was intimated that if the Government were not disposed to move in the matter, some one else would do so; and we find that the initial step has been taken by Mr. Harry S. Samuel, the member for the Limehouse Division of the Tower Hamlets, who has prepared a Bill which he proposes to introduce next session to amend the Metropolis Water Act, 1871, and to "make further provision for the due supply of water to the Metropolis." Mr. Samuel has courteously furnished us with a print of the Bill; and we give below an abstract of it's provisions.

The Act is to be cited as the Metropolis Water Act, 1899. The Metropolitan Water Companies are, within three months of the passing of the Act (unless the Local Government Board shall, by Provisional Order, extend the time), to make such junction or junctions of their mains or main pipes as may seem to the Board necessary for the effective supply of water as between the several Companies. The cost of making the junctions and effecting any repairs and renewals incidental thereto is to be divided between the Companies. They are to have power to enter into agreements with reference to the supply of water to each other; but such supply is only to be given or taken in cases of emergency with the consent of the Local Government Board, and during such periods as the Board may from time to time prescribe. Nothing contained in the Act is to prejudice or derogate from the rights and privileges which at the commencement of its operation might be lawfully exercised by the Conservators of the Thames; nor is anything to be construed to alter or vary any provision contained in Part V. of the Thames Conservancy Act of 1894, or in any other Act or agreement limiting the quantity of water to be taken from the Thames or any of its tributaries.

The foregoing epitome covers clauses 1 to 4 of the Bill. By clause 5, section 35 of the Metropolis Water Act, 1871—which gives power to the Local Government Board at any time to "appoint a competent person to inquire into and report on the quality of the water furnished by any Company," notwithstanding the absence of any complaint made and signed by twenty inhabitant householders, as prescribed by the Act of 1852—is repealed; and provision is made by the next clause that the Board may at any time appoint a competent person to inquire into and report, not only on the quality of the water supplied by any Company, but also as to the quantity of water in the Company's reservoirs, and the pressure of water in the mains. Under clause 7, the Board are to have power to require, in cases of emergency, any one or more of the Water Companies to supply water to any other of such Companies; the terms and conditions to be a matter of agreement between them, or, in default, to be as prescribed by the Board. By clause 8, any local authority may petition the Board to exercise the powers thus conferred upon them.

The next clause deals with penalties. It is provided that "any Company who violates, refuses, or neglects to comply with any of the provisions of this Act shall be liable to a penalty not exceeding £200, and to a further penalty not exceeding £100, for every week during which such violation, neglect, or refusal to comply continues." Every penalty so incurred may be sued for and recovered in a Court of Summary Jurisdiction by the local authority within the jurisdiction of which the same has been incurred; and the penalty is to be paid out of the divisible profits of the Company concerned, and is to be in reduction of dividend.

The last clause defines the expression "Metropolitan Water Companies" as meaning the eight Companies specified in section 5 of the Metropolis Water Act, 1897; and "local authority" means the Council of any county, borough, or district, the Corporation of the City, and any Vestry, District Board, or Local Board of Health in the County of London

THE LONDON COUNTY COUNCIL AND THE WATER QUESTION.

At the Meeting of the London County Council last Tuesday—Mr. T. M'Kinnon Wood in the chair—the debate was resumed on the following resolution, moved at the previous meeting by Mr. Crooks, and seconded by Mr. Stuart, M.P.: "That, in view of the existing difficulty in obtaining an adequate supply of water in a large portion of the County of London, it be an instruction to the Water Committee to forthwith submit its proposals with regard to legislation affecting the water supply in the ensuing session of Parliament." To this Mr. Beachcroft had moved, and Mr. H. P. Harris seconded, an amendment to add to the resolution the words, "and also to obtain the opinion of the Engineer as to what works are required to provide for connecting the mains and works of the several Companies for use in cases of emergency."

Mr. Dickinson, the Chairman of the Water Committee, in resuming the debate, said the real importance of the resolution rested in the word "forthwith." They were asked to take a very important, but in his opinion a very wise, step under existing conditions. In ordinary circumstances, they might hesitate to adopt the course suggested, because a Royal Commission was now sitting to whom was delegated the consideration of the whole question of the London Water Supply. It was a strong action on the part of the Council to ask Parliament for legislation of any kind until the report of that Commission was issued. But in the present circumstances of the East London Water Company, he thought the Legislature ought to be put in possession, during next session, of some scheme which should enable it, in one way or another, to deal with this question. It could not be in defiance of the Commission, but rather in the way of helping it, if the Council now put forward a scheme. There could be no doubt that the findings of the Balfour Commission were come to upon fallacious evidence. The figures as to the quantity of water flowing in the Thames for the month of August clearly showed that no amount of storage would meet the difficulty; and he believed that, if the Council laid the evidence now in their possession before the present Commission, they would see that the solution of the water problem upon the lines proposed by the Water Companies was fallacious, and that an additional supply must be secured from Wales or elsewhere if the needs of London were to be properly met. To secure unanimity, he was prepared to support the proposed addition to the resolution.

Dr. White thought it was high time that some definite parliamentary action was taken, in order to solve the water problem, which was in reality an engineering question, and should never have been made a party one.

Mr. Shaw Lefevre supported the resolution, and pointed out that the events of the past few weeks had abundantly vindicated the water policy pursued by the Council. Had the proposals of the Council been carried, there would have been no scarcity in the East-end of London. There was no real famine in the whole of London; the difficulty having arisen purely from a drought in the Lea Valley. The Council had always said that the water drawn from the Thames would not provide for the wants of London in a few years to come; and that recourse would have to be had to a supply from elsewhere. This, he thought, was now generally admitted. In regard to the policy which the Council should pursue, he considered the only course open to them was to apply to Parliament for powers to purchase, quite irrespective of the Royal Commission—and whether it reported in time or not, the Council would probably not be very much influenced by it—and he felt certain that after the experience of the past few weeks Parliament would pass a Bill on these lines.

Mr. Westacott said he had long felt that the whole of the London Water Companies ought to be under one authority, but what authority this should be was a debatable point. They should now consider not so much the past as what could be done to prevent the recurrence of such a catastrophe as that which had occurred in the East of London. He hoped that, whatever the County Council might do, Parliament would do something next session to settle the water question in the interest of the health of London. He hoped, with a view to unanimity, that the amendment would be withdrawn.

Mr. A. Smith supported the resolution. As representing an East London constituency, and having watched the recent course of events in that district, he had been driven to the conclusion that there was no remedy for the present state of affairs other than the municipalization of the London Water Supply.

Mr. Crooks appealed to Mr. Beachcroft to withdraw his amendment, on the ground that it was dangerous and dilatory.

The amendment not being withdrawn, the debate was continued.

Ultimately, however, on a division, the amendment was carried by 88 votes to 15.

Colonel Ford moved a further amendment to add the words, "and that the Committee be instructed to include in any proposed legislation power to enable this Council, with the consent of the Local Government Board, to compel general, immediate, and effective interchange of water supply by the Water Companies, upon such terms and conditions as shall be sanctioned by Parliament."

The amendment was rejected by a large majority; and the resolution, as previously amended, was adopted.

THE RECENT DROUGHT AND THE WATER SUPPLY.

The Position at the East-End and in the Provinces.

The recent rains and cooler weather have to a considerable extent mitigated the immediate effects of the severe drought at the East-end; but they have made little difference in the storage of water. The average rainfall in the Lea Valley for the week ending the 13th inst. was 0·03 inch, but even this small quantity made an impression on the volume of the flow of the river. For the first time for seven weeks, the water in the reservoirs began to rise; and each day brings in something more than what is required for the day's consumption. The Directors of the East London Water Company, however, at their weekly meeting on Thursday, did not feel justified in making any change in the arrangements. As the result of the heavy fall of rain on Sunday, the next official returns of the gaugings of the river will probably show something not far off 0·5 inch—a quantity which has not been registered for many months in the same number of days. The Company's advisers, however, recommend that the water shall not be again turned on for a full supply till the head is reached in the Walthamstow reservoirs; and it was last week calculated that about 2 inches of rainfall would be required to produce this rise in the storage—the reservoirs being about 4 feet below the head level. The new connections are working with advantage; and the result is a general increase in the pressure. The Company are negotiating for further supplies; and five wells are being sunk in the chalk—one at Lea Bridge being nearly completed. There is, therefore, a good prospect that the constant service, which has been temporarily suspended owing to extraordinary meteorological conditions, will shortly be restored; while in regard to the future, the Company consider that, should an exceptional drought occur such as has happened during the present year, their connections with other Companies' systems and their new wells will enable them to cope with all reasonable demands.

With regard to the Provinces, the Water Committee of the Birmingham Corporation, at their meeting last Friday, had submitted to them by the Works Sub-Commmittee a report concerning the measures taken to economize water during the recent drought. The consumption during the weeks of drought rose at times to over 20 million gallons per day; and for the eleven weeks to the end of September it averaged nearly 19 million gallons daily. Urgent appeals were made to the public not to waste water, and street watering was restricted. The draught upon the storage had, of course, been very great; no less than 114 million gallons being drawn from the great reservoir at Shustoke between July 28 and Oct. 10. Although rain has fallen, the replenishment of the reservoir has not yet commenced; indeed, the tendency is still further downwards, and on Friday the water stood at a lower level than at any previous period. Notwithstanding all the difficulties the Committee have had to contend with, there has been no curtailment of supply; the storage and service reservoirs on the Birmingham side of Whitacre have been kept full by constantly drawing upon Shustoke. By the present restriction of the Bradford water supply to eight hours out of the 24, Mr. J. Watson, the Water Engineer, estimates that about 3 million gallons of water are saved daily. This is principally effected upon the high level, as though the low

level supply is suspended, some 2 million gallons are pumped each day from the Heaton reservoir to that at Horton Bank top; this water having to be raised no less than 450 feet. The storage on the high level last week was 20¼ million gallons, as against 32½ million gallons in the preceding week. In consequence of the long spell of dry weather, the Accrington District Water Board have only fourteen days' supply of water in the reservoirs to serve the inhabitants of Accrington and the district. An application for water has been made to the Oswaldtwistle District Council; and they have generously offered to sell Accrington 5 to 10 million gallons in order to tide them over their difficulties. At a meeting of the Water Committee of the Leeds Corporation, held last Friday, it was decided to help as far as possible Pudsey in its difficulty with regard to scarcity of water. Leeds itself has only a supply for 30½ days, as compared with 45 days at the corresponding period of last year; but in the past Pudsey has willingly helped the city, and there was consequently a desire in the Committee to recognize this feeling by giving assistance to the adjoining urban district. Owing to the recent dry weather, the quantity of water in store in the Bideford reservoir has fallen to little more than 1 million gallons, as compared with 10½ million gallons this time last year. The Town Council have decided to limit the supply to 3½ hours per day—turning on the water from 7.30 a.m. to 9.30 a.m., and from 4 p.m. to 5.30 p.m. By excavations at the reservoir, the storage has been increased to the extent of 600,000 gallons; and Mr. Baldwin Latham is to be consulted as to other measures for increasing the supply.

THE PROJECTED WELSH WATER SUPPLY SCHEME FOR LONDON.

The Report of Sir B. Baker and Mr. G. F. Deacon.

(*Continued from p.* 828.)

In the second part of their report, the Engineers give detailed consideration to the Welsh project proposed by Sir A. R. Binnie. His scheme, it may be remembered, is divided into two main portions: (1) The Usk and Llangorse sources, calculated to supply 200 million gallons of water daily to a reservoir to be constructed at Elstree; and (2) the Wye sources, for delivering a like quantity to a reservoir near Banstead. Plans for the latter section of the scheme are now in preparation. The Engineers' observations upon the project are as follows.

The principal feature of the Usk and Llangorse scheme is the exceptionally fine site for a great reservoir afforded by a basin in the old red sandstone formation, at the bottom of which the Llangorse lake at present lies. The outlet of this lake is the Afon Llynfi, a tributary of the Wye; and across this stream the principal dam for the formation of the Llangorse reservoir would be constructed. The surface of the water would be about 93 feet above the present lake; and the available capacity of the reservoir would be no less than 38,000 million gallons. The area naturally contributing to the lake is only 9000 acres, which in relation to the magnitude of the basin is small. But the Chief Engineer proposes to supply the enlarged lake not only from its natural drainage area, but by means of conduits which will intercept and divert to it the waters of other areas. The conduit extending towards the east will convey water from an area of 25,000 acres of the Black Mountains, at present draining to the left bank of the River Usk; and that extending towards the west, being bifurcated, will pass along both banks of the Usk for the purpose of intercepting about 87,000 acres at present contributing to the upper waters of that river.

The Chief Engineer's scheme, as laid down in his report of June, 1894, provides in addition a large reservoir on the Usk near Trecastle, in which the upper waters of that river would be stored and discharged in a uniform and continuous stream only varied by overflow during floods. The compensation water thus given to the main stream of the Usk was to be supplemented by a further discharge lower down the river from the Llangorse reservoir. The aggregate of these two quantities, and the smaller quantity to be discharged down the Afon Llynfi to the Wye as compensation for the abstraction of water now supplied direct to and from the Llangorse lake, was to be so proportioned as to amount to one-third of the discharge available for London; and, inasmuch as the impounded floods would form by far the largest portion of the supply to the reservoirs, we find that this continuous flow of compensation water would not be less than three times the natural flow of the stream towards the end of a dry season, while in some parts of the river it would be double this amount. The provision thus made would therefore abundantly compensate the main river; but it would not supply the tributary streams below the level of the intercepting conduits, and some of these are so important that the question of supplying part of the compensation water to them by means of independent reservoirs was discussed between us, and we understand that the Chief Engineer concurs with us in thinking that such reservoirs should be constructed where reasonably practicable. He has therefore had the ground examined, and has provided us with supplementary information on this point. In considering the question, we have allowed for the construction of such reservoirs.

A peculiarity of the Usk and Llangorse project is the large proportion of the supply to be conveyed to the main reservoir by artificial means. But we find that, although the cost of the aqueducts necessary for this purpose is much greater than in most projects of the kind, that cost is counterbalanced by the exceptionally favourable conditions under which the great reservoir at Llangorse may be constructed. With the conduits as proposed, some of the most turbid flood water would be rejected; but the volume thus lost has been fully taken into consideration in computing the available discharge.

In estimating the yield of the various districts, we have assumed the correctness of Mr. G. J. Symons's rainfall gaugings. The gauges fixed under his superintendence are sufficient in number; and observations extending over two years have afforded, by comparison with the records of old gauges in the neighbourhood, sufficient data for forming a trustworthy estimate of the mean rainfall over long periods. The results of our independent calculations have satisfied us that with this rainfall, and with the reservoirs originally proposed by the Chief Engineer and those for compensation to the tributary streams which he has since added, the Usk and Llangorse areas may be depended upon to yield, after giving abundant compensation to the streams, a supply to London of not less than 181 million gallons a day.

In order to increase this quantity to about 200 million gallons, the Chief Engineer has proposed in his report to construct a reservoir on the Edw, a tributary of the Wye. We find that this reservoir will yield for London about 16 million gallons a day, and will therefore bring up the available total for this part of the scheme to about 197 million gallons a day. It is not necessary, in the first instance, to carry out such further work, or even to expend the whole of the money required to complete the aqueduct for a supply of 181 million gallons to London, as it is proposed to divide the portion of each main aqueduct under pressure into three independent conduits, which may be constructed as required.

The supply, thus far considered, of about 200 million gallons a day to London, may, if additional water is at any time required, be supplemented from other reservoirs to be constructed on the Wye and its tributaries, as proposed by the Chief Engineer. The compensation waters to be given to the rivers affected by such additional reservoirs would be in the same proportion to the supply as that already set forth in the case of the Usk and Llangorse areas, and substantially the same also as that now given from the Vyrnwy reservoir, and provided to be given from the Elan reservoirs by the Act under which they are being constructed.

The first reservoir in the second part of the Chief Engineer's scheme is to be constructed on the Yrfon, a tributary of the Wye. In addition to compensation water, it would yield 121 million gallons for London; and nearly the whole of the available rainfall would flow into it without the use of intercepting conduits. At the time of constructing this reservoir, or at any subsequent time, the yield may be increased by means of a supply from the River Towy, which falls into the sea near Carmarthen. The additional water would pass through a tunnel constructed from the Towy Valley to the Yrfon Valley; and the abstraction would be compensated for by a reservoir on the Towy. These works would add 44 million gallons a day to the available yield of the Yrfon reservoir, and thus bring it up to a total of 165 millions. Next in the list comes the Ithon reservoir, which from its own drainage area will yield the necessary compensation and 28 million gallons a day for London. After the construction of an independent compensation reservoir in the adjoining Clywedog Valley, this quantity from the Ithon would be increased by 9 million gallons a day. On the upper waters of the Wye the last reservoir proposed by the Chief Engineer would be constructed; and this we find may be depended on to yield for London 46 million gallons a day.

It thus appears that while the rainfall as now ascertained will enable the works proposed by the Chief Engineer in the Usk, Llangorse, and Edw Valleys to yield for London very nearly 200 million gallons a day, it will ensure from those he has proposed in the remaining valleys about 248 million gallons a day, should such an additional quantity ever be required; but as we are not asked, and do not think it necessary, to take into consideration the construction of aqueducts for more than 400 million gallons a day, we have thought it desirable to simplify the question by the omission of the Ithon and Clywedog reservoirs, which would yield together 37 million gallons a day, and would cost per million gallons more than any of the others. Thus modified, the various instalments of the Chief Engineer's scheme for an ultimate supply, if ever required, of 400 million gallons a day, might be executed in the following order—

Works to be Constructed.	Each Instalment. Mill. Galls.	Aggregate. Mill. Galls.
Usk and Llangorse Sources.		
First Instalment—Usk and Llangorse reservoirs, with aqueduct complete for 200 million gallons a day (except portions under pressure which may be divided into three instalments) and Elstree service reservoir	66⅔	66⅔
Second Instalment—Second portion of aqueduct under pressure	66⅔	133⅓
Third Instalment—Edw reservoir and third portion of aqueduct under pressure	63⅓	197
Wye Sources.		
Fourth Instalment—Yrfon reservoir, with aqueduct complete for 200 million gallons a day (except portions under pressure which may be divided into three instalments) and Banstead service reservoir	66⅔	266⅔
Fifth Instalment—Towy reservoir, tunnel, and aqueduct	66⅔	333⅓
Sixth Instalment—Wye reservoir and aqueduct .	66⅔	400

We need hardly remark that, if found expedient, the above order of execution of the different instalments may be varied, and the supply from the Wye sources be executed first. Further detailed studies of the Wye project must be undertaken before the relative merits of the two schemes can be definitely settled.

We have now, in accordance with the terms of this reference, to consider the estimates of the Chief Engineer for the proposed Welsh supply. As regards the first additional supply of 200 million gallons of water to London, we will assume that, whether the Usk and Llangorse or the Wye sources were resorted to, the aqueduct would follow the line adopted by the Chief Engineer for the Usk and Llangorse project, and deliver into a reservoir at Elstree. On the basis of detailed estimates forwarded to us in June, 1896, including the subsidiary compensation reservoirs already referred to, the cost of the different instalments of the 197 million gallons per day from the Usk and Llangorse sources delivered into a terminal reservoir at Elstree would be as follows:—

First instalment of	66⅔	million gallons	£11,427,193
Second „	66⅔	„	989,969
Third „	63⅓	„	1,594,968
		Total . . .	£14,012,130

The above sum includes £982,000 for the service reservoir at Elstree, and 10 per cent. for contingencies, but nothing for filters and connection with existing distributing-pipes, which, including 10 per cent. for contingencies, the Engineer estimates at £3,435,300.

As regards the sum of 14 millions sterling, we have fully considered the details, and have thought it desirable to increase the estimates in some instances; but in others we think a saving will be effected. We have added the cost of further compensation reservoirs on the tributaries of the Usk; and the result of the various adjustments is to bring our

estimate of the total cost of the works to deliver 200 million gallons a day into a reservoir at Elstree for distribution in London nearly to the same figure as that proposed by the Chief Engineer.

As regards the second sum of nearly 3½ millions sterling, we think the estimate will prove to be in excess of the real requirements. We have considered how far this estimate would be common to the Welsh scheme and to any scheme for pumping an equal quantity of water from the Thames. The sum included by the Chief Engineer for filters might be necessary for filters of the area required for Thames water; but experience of the filtration of mountain water shows that it is greatly in excess of the expenditure required in connection with the Welsh scheme. Having regard to all the circumstances, we think that this estimate of 3½ millions somewhat reduced in amount may be fairly assumed to be common to the Welsh scheme and to any scheme for the supply of Thames water; and we shall therefore omit it from any comparison we may make between the two.

Assuming the first part of the scheme to be modified by carrying out works for the supply of 200 million gallons a day from the Wye sources instead of from the Usk and Llangorse sources, without varying the line of aqueduct or the Elstree reservoir, the cost of the several instalments would be as follows:—

First instalment of 66⅔ million gallons. . . .		£10,215,292
Second	„ 66⅔ „	1,759,968
Third	„ 66⅓ „	1,924,969
	Total . . .	£13,900,229

The ultimate cost of the alternative schemes treated in this manner is thus practically the same, but that of the first instalment of the Wye project is materially less, and there is a probable advantage in the latter arrangement, as the Usk and Llangorse sources now appear to yield about 1½ per cent. less than the 200 million gallons a day, while the yield of the Wye scheme, even after the omission of the Ithon and Clywedog, as in the above estimate, is in excess by about 5½ per cent. We also think that the latter estimate allows a margin for the purchase of land and easements considerably in excess of that provided in the case of the Usk and Llangorse sources.

We have checked the Chief Engineer's estimates of the cost of obtaining a further supply of 200 million gallons from the Wye sources with a reservoir at Banstead Downs. On the assumption that the first supply is taken from the Usk and Llangorse, we do not appreciably differ in our results, though, for reasons already stated, we think the estimate may be reduced by the omission of the Ithon and Clywedog reservoirs.

(To be continued.)

The Rossendale Union Gas Company's Assessment Appeal.—The appeal of the Rossendale Union Gas Company against the assessment of their property will be heard by Mr. Worsley Taylor, Q.C., the Recorder, at the Preston Quarter Sessions next Thursday. The proceedings will be watched with much interest by several local gas companies who have similar appeals in contemplation.

THE FYLDE WATER-WORKS TRANSFER.

Terms of the Proposed Agreement.

The stockholders of the Fylde Water-Works Company have received the draft agreement which has been entered into by the Directors and the Water Board for the transfer of the undertaking. The Local Authorities of Blackpool, Fleetwood, Lytham, and St. Anne's together constitute the Board.

If the agreement is accepted by the stockholders at the next half-yearly meeting, each holder of stock "A" will receive certificates of the new Board for £363 12s. 9d. of 2¾ per cent. stock for every £100 of old stock, and so on in proportion for any greater or less amount, repayable at par (£363 12s. 9d.) fifty years from the date of transfer. In like manner, each holder of £100 of stock "B" will receive certificates for £254 10s. 11d. of 2¾ per cent. stock. In like manner, each holder of £100 preference stock will receive certificates for £145 9s. 1d. of 2¾ per cent. stock. The interest payable half-yearly to each shareholder will be exactly the same as received at present—viz., the maximum rate of dividend it is possible for the Company to pay. In addition to the above, the new Board pay the Company £37,000 in cash and one year's interest thereon—a portion of this amount to form a compensation fund, as the stockholders may determine. The new Board pay costs, and assume the whole of the liabilities of the Company. They also agree to take up £100,000 of stock certificates if required, as named in the draft agreement. The management of the works is to remain in the hands of the Directors of the Company until Aug. 31, 1899. Clause 2 of the agreement states: "The consideration for the sale of the said undertaking shall be the sum of £802,455 12s., of which the sum of £37,000 shall be paid by the Water Board to the Company in cash; and the sum of £765,455 12s. shall be satisfied by the allotment or payment to stockholders of the Company of stock of the Board or cash in lieu of stock." The Board are to create stock to the amount of £765,455 12s. 6d., to carry interest at the rate of 2¾ per cent. per annum. Of this sum, £218,182 10s. is to be distributed and allotted *pro rata* among the registered holders of the £60,000 of consolidated "A" stock of the Company; £445,455 4s. 2d. among the holders of the £175,000 of consolidated "B" stock; and £101,817 18s. 4d. among the holders of the £70,000 of 4 per cent. preference stock. On the completion of the purchase on Aug. 31, 1899, the £37,000, together with interest at the rate of 3 per cent. from Aug. 31 last, is to be paid by the Board to the Company; and all stocks of the Board and cash is to be allotted and paid respectively by the Board to the stockholders. The proceedings in the arbitration are to be stayed as soon as the Bill for confirming this agreement shall have received the Royal Assent. The Company are to be at liberty until completion to declare and pay dividends in accordance with their respective Acts, on the existing stocks, out of the net profits of the year or part of a year. The Board are not at any time to create or issue any stocks which shall rank in priority to the said Fylde Water Board "A" stock; but they may issue similar stock.

The half-yearly report of the Directors of the Company is noticed in to-day's issue on p. 880.

GAS AND WATER COMPANIES STOCK AND SHARE LIST.

Referred to on p. 861.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 13	10½	Alliance & Dublin 10 p. c.	21½—22¾*	..	4 13 4
100,000	10	„	7½	Do. 7 p. c.	16—17*	..	4 8 3
300,000	100	July 1	5	Australian 5 p. c. Db. .	105—107	..	4 13 6
200,000	5	May 26	6	Bombay, Ltd.	6½—7	..	4 5 9
40,000	5	„	6	Do. New, £4 paid .	4½—5	..	4 16 0
880,000	Stk.	Aug. 12	12	Brentford Consolidated	275—280	..	4 5 9
240,000	„	„	9	Do. New . . .	210—215	..	4 3 9
50,000	„	„	5	Do. 5 p. c. Prf.. .	140—145	..	3 9 0
159,375	„	June 10	4	Do. 4 p. c. Db. Stk.	130—135	..	2 19 3
220,000	Stk.	Sept. 15	11½	Brighton & Hove, Orig..	263—268	+1	4 5 10
226,330	„	„	8½	Do. A. Ord. Stk. .	190—195	..	4 7 2
933,500	Stk.	Aug. 31	5	Bristol, 5 p. c. max. . .	125—130	..	3 16 11
420,000	20	Sept. 29	10	British	50—52	..	3 16 11
50,000	10	Aug. 12	11½	Bromley, Ord. 10 p. c. .	25—27	..	4 5 2
75,000	10	„	8½	Do. 7 p. c. .	20—22	..	3 17 3
500,000	10	Oct. 13	6	Buenos Ayres (New) Ltd	9—9⅜*	+⅛	6 6 4
98,122	Stk.	June 29	4	Do. 4 p. c. Db. Stk.	98—100	..	4 0 0
150,000	20	July 14	8½	Cagliari, Ltd.	29—30	..	5 10 0
100,000	10	Sept. 29	7	Cape Town & Dis., Ltd.	15—16	..	4 7 6
50,000	50	May 3	6	Do. 6 p. c. 1st Mort.	58—60	..	5 0 0
550,000	Stk.	Oct. 13	13½	Commercial Old Stock .	310—320*	+1½	4 4 5
200,750	„	„	10½	Do. New do. . .	247—252*	+½	4 3 4
200,750	„	June 10	4½	Do. 4½ p. c. Db. do.	148—153	..	2 18 10
800,000	Stk.	June 10	12	Continental Union, Ltd.	207—212	..	5 13 2
200,000	„	„	9	Do. 7 p. c. Prf. .	193—198	..	4 10 11
51,600	Stk	Aug. 31	14	Croydon A 10 p. c. . .	805—810	..	4 10 4
168,400	„	„	11	Do. B 7 p. c. . .	255—265	..	4 3 0
555,000	Stk.	Aug. 12	5½	Crystal Palace Ord. 5 p. c.	125—130	..	4 0 9
60,000	„	„	5	Do. 5 p. c. Prf. .	140—145	..	3 9 0
486,090	10	July 28	11	European, Ltd. . . .	23—24	..	4 11 8
354,060	10	„	11	Do. £7 10s. paid .	17—18	..	4 11 9
5,922,230	Stk.	Aug. 12	12½	Gaslight & Coke, A, Ord	290—295	−2	4 3 0
100,000	„	„	4	Do. B, 4 p. c. max. .	120—125	..	3 4 0
665,000	„	„	10	Do. C, D, E, 10 p. c. Prf.	308—313	+1	3 3 11
80,000	„	„	5	Do. F, 5 p. c. Prf. .	152—157	..	3 3 8
60,000	„	„	7½	Do. G, 7½ p. c. do. .	230—240	..	3 2 6
1,300,000	„	„	7	Do. H, 7 p. c. max. .	195—200	..	3 10 0
463,000	„	„	10	Do. J, 10 p. c. Prf. .	308—313	+1	3 3 11
476,000	„	„	6	Do. K, 6 p. c. Prf. .	185—190	..	3 3 2
061,150	„	June 10	4	Do. 4 p. c. Db. Stk. .	131—133	..	3 0 2
294,850	„	„	4½	Do. 4½ p. c. do. .	148—153	..	2 18 10
958,000	„	„	6	Do. 6 p. c. do. .	198—203	..	2 19 1
70,000	10	May 12	8	Hongkong & China, Ltd.	14—15	..	5 6 8
8,800,000	Stk.	„	10	Imperial Continental .	228—233	..	4 5 10
376,400	100	Aug. 2	4	Do. 4 p. c. Dbs. Red.	98—101	..	3 19 3
473,600	Stk.	Aug. 12	3½	Do. 3½ p. c. Db. Stk. „	101—104	..	3 7 4
660,000	100	Oct. 1	5	Met. of Mel- bourne } 5 p. c. Db.	110—112	..	4 9 3
250,000	100	„	4½	} 4½ p. c. Db.	105—107	..	4 4 1
					* Ex div.		

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
75,000	5	June 29	6	Malta & Medn., Ltd. .	4¾—5¼	..	5 14 3
541,920	20	June 10	5	Monte Video, Ltd. . .	13½—14½	..	6 18 0
617,946	Stk.	Aug. 31	9¾	Newc'tle & Gateshd Con.	230—240	..	4 1 3
252,355	Stk.	Jan. 3	5½	Do. 3½ p. c. Db. Stk.	113—117	..	2 19 10
150,000	5	May 26	8	Oriental, Ltd. . . .	7½—8	..	5 0 0
135,000	5	„	8	Do. New, £4 10s. pd.	6½—7	..	5 2 11
15,000	5	„	8	Do. do. 1879, £1 pd.	1¾—1¾	..	4 11 5
60,000	5	Sept. 29	7	Ottoman, Ltd. . . .	5—5½	..	6 6 2
500,000	100	June 1	6	People's Gas } 2nd M. of Chicago } Bd. .	103—108	..	5 11 1
848,070	10	Oct. 13	6	River Plate Ord.. . .	9—9¼*	..	6 6 4
250,000	Stk.	June 29	4	Do. 4 p. c. Db. Stk.	99—101	..	3 19 3
250,000	10	Sept. 29	10	San Paulo, Ltd. . . .	14½—15¾	..	6 9 0
135,000	Stk.	Sept. 15	10	Sheffield A.	243—245	..	4 1 8
209,053	„	„	10	Do. B.	242—245	..	4 1 8
447,427	„	„	10	Do. C.	242—245	..	4 1 8
5,600,000	Stk.	Aug. 12	5½	South Metrop., 4 p. c. Ord.	140—143	..	3 14 7
1,460,000	„	July 14	3	Do. 3 p. c. Db. Stk. .	102—105	..	2 17 2
60,000	Stk.	Aug. 31	12	Tottenham and } A. . Edmonton } B. .	280—290	..	4 2 9
60,000	„	„	9		200—210	..	4 5 9
182,380	10	June 10	7	Tuscan, Ltd.	10½—11½	..	6 1 9
149,900	10	July 1	5	Do. 5 p. c. Dbs. Red..	100—103	..	4 17 1
				WATER COMPANIES.			
746,164	Stk.	June 29	10½	Chelsea, Ord.	313—318	..	3 6 0
150,000	„	„	5	Do. 5 p. c. Prf. . . .	170—175	..	2 17 2
160,000	„	„	4½	Do. 4½ p. c. Pf. Stk., 1875	148—152	..	2 19 3
175,785	„	Sept. 29	4½	Do. 4½ p. c. Lb. Stk. .	155—160	..	2 16 8
1,720,560	Stk.	Oct. 13	7	East London, Ord. . .	212—217*	+½	3 4 6
654,740	„	June 29	4½	Do. 4½ p. c. Db. Stk.	157—160	..	2 16 3
390,000	„	„	3	Do. 3 p. c. Db. Stk..	103—105	..	2 17 2
700,000	50	June 29	7½	G'd Junct'n, 10 p. c. max.	115—118	..	3 3 7
310,000	Stk.	Sept. 29	4	Do. 4 p. c. Db. Stk.	140—145	..	2 15 2
708,000	Stk.	Aug. 12	14	Kent	365—370	..	3 15 8
160,000	„	„	7	Do. New, 7 p. c. max..	212—217	..	3 4 6
1,043,800	100	June 29	10	Lambeth, 10 p. c. max..	300—305	..	3 5 7
406,200	100	„	7½	Do. 7½ p. c. max..	227—232	..	3 4 8
350,000	Stk.	Sept. 29	4	Do. 4 p. c. Db. Stk.	140—145	..	2 15 2
500,000	100	Aug. 12	12½	New River, New Shares	435—440	..	3 0 2
1,000,000	Stk.	July 28	4	Do. 4 p. c. Db. Stk.	140—145	..	2 15 2
902,300	Stk.	June 29	6	Southw'k & V'xhall, Ord.	168—171	..	3 10 2
126,500	100	„	6	Do. do. 7½ p. c. max..	160—165	..	3 12 9
489,200	Stk.	„	5	Do. do. 5 p. c. Prf. .	170—173	..	2 17 0
1,019,585	„	Oct. 13	4	Do. 4 p. c. A Db. Stk.	139—142*	..	2 16 4
1,155,066	Stk.	June 10	10	West Middlesex . . .	300—305	..	3 5 7
200,000	„	„	4½	Do. 4½ p. c. Db. Stk.	162—165	..	2 14 7
200,000	„	Sept. 15	3	Do. 3 p. c. Db. Stk.	102—105	..	2 17 2
					* Ex div.		

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

It is known that wiser counsels prevailed in Peebles upon the subject of the gas transfer, over those which the Town Council were at first disposed to follow; and it now falls to be recorded that a formal agreement has been entered into between the parties. This week it was adopted at a meeting of the shareholders of the Gas Company, and is now final so far as they are concerned. Adoption by the Town Council is to take place whenever the Burghs Gas Supply Act comes into force, which, of course, cannot be until after the November elections. There is a provision that, unless the agreement be adopted by both parties prior to Jan. 15 next, the transaction shall be at an end. This provision is, however, not now likely to come into operation. The date of transfer is to be held as at Whitsunday, 1898. Meantime, the Company are carrying on the gas-works for the behoof of the Corporation, under conditions set forth in the formal agreement, one of which is that the Commissioners are to pay the Directors an allowance at the rate of £35 per annum, as remuneration for the period from May 15 last till the dissolution of the Company. The Commissioners are to pay all the debts of the Company, including law charges, and also the expenses of the transfer. The shareholders of the Company are to receive annuities at the rate of 10 per cent. for 35 years, at the end of which time they are either to be paid £157 10s. for every £100 of the nominal amount of stock held by them, or, in the event of non-payment, they are to be entitled to 5 per cent. interest upon the amount till payment be made. There is a provision of rather a peculiar nature at first sight, but which, on second thought, is seen to be necessary in order to provide capital for the Commissioners. It is to the effect that the shareholders of the Company shall lend the capital sum they will be entitled to in 1933 to the Commissioners upon mortgage, without interest. Till then the annuities are the interest upon the capital. In 1933, when the annuities cease to be payable, the Commissioners, if they are not in a position to refund the capital sums, shall pay the 5 per cent. rate of interest. On these terms, the Commissioners are to receive, as at May 15 last, "the whole undertaking of the Company, including all the property and assets thereof . . . and the whole business, lands, premises, works, and other property, heritable and moveable, thereof." The accumulated funds of the Company thus pass over to the Commissioners, as well as all stocks on hand at May 15 last, without payment.

The Corporation of Dumbarton have reduced the price of gas from 2s. 9d. to 2s. 6d. per 1000 cubic feet for private lighting; and for public lighting the rates are to be 21s. per lamp per year, or 1s. 8d. per 1000 cubic feet. There are no meter-rents. The gas supplied is of 25-candle power. The mere mention of these facts is a tribute to the excellence of the management of Mr. M'Gilchrist who, it is evident, has control of the gas undertaking well in hand. One evidence of this is the extent to which gas is used by the people in Dumbarton. I have been comparing the figures for several places; and I find that Dumbarton stands among the first four or five towns of some size in the matter of the highest percentage of gas consumers. This argues confidence on the part of the community in the management of the undertaking; and this opinion is not shaken by the fact that I find that Forfar, where a section of the members of the Corporation do as much as they can to create dissatisfaction with the gas management, possesses the highest percentage of all the towns whose results I have looked at, because Forfar is only the exception—the other towns being all places where the gas managers do their work in peace. The outcome of the high percentage of consumers in Dumbarton is to be found in the circumstance that the engineers' strike reduced the consumption of gas considerably. Indeed, it was this information which led me to look into the matter. I learn that this is the first year since the Corporation have owned the works—the transfer having been in 1873—in which they have had to look behind; and also that the gas consumption is greatly on the increase at the present time. Down till now, the Corporation have been in the habit of taking large sums from the gas profits, and placing them to the Common Good of the burgh. The pernicious practice is not likely to be repeated, as there is a feeling among the consumers that they ought to get gas at cost price. Should this be effected, further reductions in price may be looked for.

The town of Johnstone, in Renfrewshire, is celebrated for the manufacture of the highest quality of wood and iron tools. It is a flourishing place, increasing by leaps and bounds. In this increase the Corporation Gas Department is also a participant. It has been found necessary to double the capacity of one of the holders, by telescoping it. The work has been done by the Barrowfield Iron-Works, Limited, of Glasgow, to plans prepared by Mr. J. M'Gilchrist, of Dumbarton. It is now completed; and on Thursday the gas was turned into the new holder by Mr. Thomson, the Provost of the burgh. He stated that the gas undertaking was acquired by them in 1879. In 1880, the price was 5s. 1d. per 1000 cubic feet; and it is now 3s. 4d. They had also reduced by £11,000 the debt incurred to pay the purchase price. The work of doubling the holder has been carried out to the satisfaction of all. After the ceremony of turning on the gas, the assembled company sat down to dinner in the Council Chambers. Among other toasts which were drunk were those of the Engineer (Mr. M'Gilchrist) and of the Contractors. Mr. M'Gilchrist presented Provost Thomson with a silver-mounted walking stick; and Mr. Ewen, of the Barrowfield works, presented Bailie Lang, the Convener of the Gas Commission, with a pair of bronze figures with gas-globes.

It is stated that tenders have been received by the Corporation of Glasgow for supplies of cast-iron water-pipes, and that it is not likely any more orders will go to America. There is considerable chagrin in Glasgow at the report which has been circulated within the past few days, that the Americans have taken advantage of the fact that they have got two small orders for pipes from Glasgow to advertise largely in different parts of the world that they supply the Corporation of Glasgow with pipes. This is a circumstance which is calculated to do great harm to the pipe trade of Glasgow; and it is certainly to be regretted that neither the Corporation nor the pipefounders were astute enough to foresee it. On this subject, I see the statement was made at a public meeting that in the Town Council the labour representatives supported the motion to send the orders to America. It is characteristic of the commercial blindness

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of their class that they, in their eagerness to administer a blow at their supposed enemy capital, did not hesitate to take a step in the direction of depriving their fellow-workers of the means of making their daily bread. If it were possible for shame to arise in the faces of such people, they ought never to meet a working man without blushing to the roots of their hair.

The Gas Committee of the Glasgow Corporation had a long meeting on Tuesday, upon the subject of the proposed new gas-works at Blochairn. No resolution was arrived at; but it is reported that the Committee still adhere to the idea of erecting the new works on the site selected, and that they should purchase an additional piece of land on the adjoining estate of Blackhill. This estate is already the property of the Corporation. It was purchased many years ago as a proposed site for a prison; but the Government of the day did not adopt it. Blackhill has remained on the hands of the Corporation ever since, and has been an unprofitable investment. Its altitude makes the greater part of it unsuitable as the site of a gas-works. The opposition to the proposal to go to Blochairn is still being pushed by east-end residents; but I cannot say it is growing.

The report of the two Accountants who were appointed to examine the system of financing practised by the Forfar Gas Corporation was submitted to the Corporation last night. It is a long document, and has been ordered to be printed for circulation. No further information regarding it has transpired, except that it recommends several changes in the method of book-keeping employed. So much might have been expected, as a matter of course.

The Arbroath Gas Corporation met on Thursday night to consider the proposal to promote a Bill in Parliament giving them increased borrowing powers. The Clerk reported that the Committee of Management recommended that borrowing powers to the amount of £15,000 be applied for. Provost Grant moved the recommendation, and in doing so pointed out the advantages which the Corporation would have in possessing power to borrow, even though they did not require to use the money. Ex-Bailie Strachan wished to know what the money was wanted for, and moved disapproval of the Committee's recommendation; but he was told that he was out of order. He thereupon gave notice of motion on the subject; and the Corporation agreed to meet on an early date to consider it.

At a meeting of the Perth Gas Commission on Monday, the Commissioners approved of the plans for the new gas-works which have been prepared by Mr. Foulis, of Glasgow, with the exception that they enlarged one or two parts of the plant. Mr. Cuthbert, the Convener of the Works Committee, said that the retort-house would contain 240 retorts, which would be capable of producing 2 million cubic feet of gas per day. At present, with 122 retorts, they were able to make 1,100,000 cubic feet per 24 hours. Mr. Foulis estimated the cost at £21,000, which would exhaust the borrowing powers of the Commission.

The Town Council of Edinburgh on Tuesday considered a recommendation by the Treasurer's Committee to lend £150,000 to the Edinburgh and Leith Gas Commissioners, at the rate of 3 per cent. interest per annum. Mr. Cranston moved disapproval of the recommendation, chiefly on the ground that the Corporation of Edinburgh were already involved, in the matter of temporary loans, to the amount of £600,000, and could not afford to lend any more; and, besides, he did not consider it business to borrow money and to re-lend it at the same rate of interest. The feeling was expressed that the Gas Commission was an arrangement which must some day cease, and the undertaking come into the management of the Corporation directly; and that this consolidation of the indebtedness of the community was a step in that direction. At a meeting in which there were 44 members present, Mr. Cranston had only one supporter; and thus the recommendation of the Committee was adopted by 42 votes to 2.

It was reported to the Paisley Gas Commissioners, on Tuesday, that the Gas Committee had had under consideration the propriety of insuring their workmen, to meet claims for compensation for accident; and the Committee recommended that an offer by the Vulcan Boiler and General Insurance Company, at a premium of 10s. per cent. of the wages paid, should be accepted. This was agreed to.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Oct.* 15.

Sulphate of Ammonia.—On the East Coast the market has been very slow; and prices have drooped. On the West Coast, however, there has been a better demand for immediate delivery, and the moderate quantity offered has been readily absorbed. The closing quotations are £9 10s. per ton f.o.b. Hull and Leith, and £9 13s. 9d. per ton f.o.b. Liverpool. The difficulties with the shale miners in Scotland, which have for some time been brewing, have come to a head; and the dispute has been settled, in the case of one of the largest oil works, by an advance in wages of 6d. per day. It seems likely that a settlement on a similar basis may be arrived at by the other oil concerns; and it is to be hoped that by this means further trouble may be avoided. In the forward position, the Scotch makers are practically off the market. London make may, however, be had for some months ahead at £9 10s. per ton, Beckton terms; and there is speculative offering abroad at something under the equivalent of the price.

Nitrate of Soda is steady at 7s. 7½d. per cwt. for good, up to 7s. 9d. per cwt. for refined quality, on spot.

LONDON, *Oct.* 15.

Tar Products.—Carbolic acid is selling freely; and makers seem disposed to contract for a considerable period ahead at current rates, which is singular having regard to the extent of business being done. There is still a fair demand for creosote; and heavy oils and pitch continue in moderate request at former rates. There is no life in anthracene, and it continues to drag along neglected. The production is undoubtedly being restricted, which should by and bye tell its tale on the value. The low price of benzols seems to be recognized both by sellers and buyers; and a large business is reported at prices maked below.

To-day's values may be taken as: Tar, 14s. to 19s. Pitch, east coast, 25s.; west coast, 23s. Benzols, 90's, 8½d.; 50's, 9d. Toluol, 1s. 1½d. Solvent naphtha, 1s. 2d. Heavy naphtha, 1s. 1d. Crude, 30 per cent.

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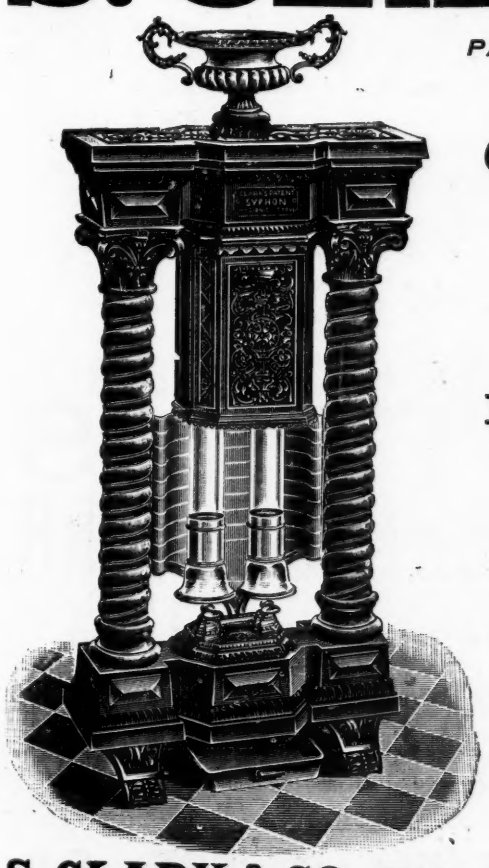

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naphtha, 3¼d. Creosote, 2⅝d. Heavy oil, 45s. to 50s. Carbolic acid, 60's, 1s. 11d. Naphthalene, 55s.; salts, 32s. 6d. Anthracene, "A," 4d.; "B," 3d.

Sulphate of Ammonia.—The price of sulphate has gradually fallen apparently without any substantial reason, excepting that buyers are holding off. Important quantities have changed hands at prices ranging between £9 8s. 9d. to £9 11s. 3d. per ton, less 3¼ per cent.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—Though, with regard to the better qualities of round coal, there is still an absence of that briskness of demand for house-fire purposes which is usually looked for at this time of the year, generally the position throughout the coal trade of this district is satisfactory. Prices are being fully maintained, with collieries as a rule working full time, and only in exceptional cases not disposing of all their present output. Supplies of common round coals here and there are rather more plentiful; but this is due chiefly to lessened requirements for shipment—the inland demand for steam and forge purposes continuing brisk. Good qualities are fetching from 7s. 6d. to 8s. 6d. per ton at the pit. Slack maintains the hardening tendency reported last week; and though in the open market there is no actual scarcity of supplies, many of the leading collieries are experiencing a difficulty in meeting the requirements of their customers, and generally there is a disinclination to book forward contracts except at an advance. Current rates average 3s. 6d. to 3s. 9d. per ton at the pit for the common sorts; 4s. 3d. to 4s. 6d., for good medium descriptions; and 4s. 9d. to 5s. 3d., for the best qualities. The shipping trade, taking it all through, is only quiet; and rather low prices, as compared with those that have previously been obtained without difficulty, have been quoted. Common sorts of steam coal have been purchaseable at as low as 8s. 9d. to 9s. per ton, with 9s. 6d. representing about an average figure for good qualities, delivered at the Mersey ports.

Northern Coal Trade.—The coal trade is quieter, but not equally so in the great branches. The shipments to the upper ports of the Baltic are now beginning to fall off; and this has its effect most on the fuel from Northumberland. Best steam coals are quiet at 9s. 9d. per ton f.o.b.; steam smalls are 5s. 9d.; and second-class steam are about 9s. Manufacturing coals continue steady, and the prices are well maintained. In gas coals, there is an increasing demand. Sales of single cargoes of gas coals continue at prices that vary from 9s. 9d. to 11s. per ton f.o.b.; but some contracts have been entered into for best Durham gas coals for export next year at a little over 9s. For gas coke, the demand is well sustained; but with the larger production now, the market finds a better supply. The price of gas coke for export is firm; while that for home use is unaltered.

Scotch Coal Trade.—The demand continues good, but chiefly for home supplies; foreign trade being weaker. In consequence, prices have suffered a slight decline. The quotations are: Main, 8s. per ton f.o.b. Glasgow; ell, 9s.; and splint, 9s. 3d. The shipments for the week were 196,499 tons—a decrease of 9916 tons upon the previous week, but an increase of 28,802 tons upon the corresponding week of last year. For the year to date, the total shipments have been 7,648,863 tons—an increase upon the same period of last year of 1,424,365 tons.

The Reigate Corporation and the Local Gas-Works.—The ratepayers of Reigate have been invited by the Mayor to attend a public meeting to-morrow to sanction the promotion of a Bill to enable the Corporation to acquire the local gas-works. In view of this fact, the Directors of the Redhill Gas Company have, through their Secretary (Mr. Read), pointed out to the burgesses what may be the result of the success of the Corporation's scheme. In the first place, they must borrow a very large sum of money. Then it is practically certain that the consumers will not be benefited by having the price of gas reduced for many years to come. If there should be a surplus profit on the working, it will be applied towards reducing the rates, so that everything will come out of the consumers' pockets to benefit owners of land and others who are not consumers; whereas, should the Company be left alone, they will have the benefit of all reductions in price of gas. A very significant point in Mr. Read's circular is that the present price of gas will be reduced 2d. per 1000 cubic feet on the 1st of January next. This reduction would, it is pointed out, have been made many months earlier had not the Corporation opposed the Company's Bill in Parliament, and thereby put the Company to serious expense, besides inflicting an extra rate on the townspeople in order to defray the Corporation expenses.

Fylde Water Company.—The report of the Directors of this Company states that the expenditure on capital account during the past half year has been £12,632, and the account stands at £446,939. This amount includes the sum of £76,665 paid towards the new works authorized by the Fylde Water Act, 1896. Interest upon the outlay has been charged to revenue; but no income has yet been derived from it. The water-rates and other receipts during the half year ending Aug. 31, after an allowance of £382 for empty houses, &c., and bad debts, amount to £19,858; the interest on loans and bank commission amount to £1519; and working expenses, rents, rates, and taxes to £4191. This leaves a balance of £14,147, to which an amount brought forward from the last account is added—making a total balance of £29,939. Dividends on the subscribed stock at the rate of 4 per cent. per annum on the preference stock, 1891; at the rate of 10 per cent. per annum on the "A" stock; and at the rate of 7 per cent. per annum on the "B" stock, are recommended—leaving a balance of £19,765 to be carried to the next account. The Directors report that the net profit of the Company still continues to show a considerable increase; the increase for the past year being about £2500, after providing for the payment of interest upon £76,665 expended on works in process of construction. The Directors announce that, after considerable negotiation with the authorities constituting the new Fylde Water Board, they have, subject to the sanction of the stockholders, entered into an agreement with the Board for the purchase of the undertaking, which agreement the Directors recommend for consideration. If the terms of the agreement be refused by the stockholders, the value of the works will have to be determined by arbitration, as fixed by the Fylde Water-Works Transfer Act, 1897.

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Reductions in Price.—The reduction in the price of gas in the borough of Heywood takes effect with the present quarter; the amount being 2d. per 1000 cubic feet. The new rates are as follows: Gas issued for illuminating purposes, 2s. 10d. per 1000 cubic feet (after discount for prompt payment); for stoves and motive power, 2s. 4d. net; and for prepayment meters, 3s. 7d. per 1000 cubic feet. The Gas Committee of the East Retford Corporation have decided to reduce the price of gas by 2d. per 1000 cubic feet; bringing it down to 3s. 2d., less 5 per cent., or 3s. net.

The Nominee Directors of the Sheffield Gas Company.—Little is ever heard of the action of the Directors of the Sheffield United Gas Company who are appointed, under the terms of the Company's Act of Parliament, by the Corporation. Their utility was, however, exemplified at the meeting of the Town Council last week, when one of them was enabled to give a personal explanation as to some local complaints about the gas supply. On Alderman Gainsford, Alderman Langley, and Mr. Uttley being re-appointed Nominee Directors of the Company, the last-named gentleman referred to the fact that a number of complaints about the insufficiency of gas had been received lately. He believed the failures in the mains were to be attributed to the exceptional atmospheric conditions. The Company were, however, doing all in their power to prevent further annoyance to consumers.

Stockton and Middlesbrough Water Board.—Last Thursday the members of the Stockton, Middlesbrough, and Thornaby Corporations, on the invitation of the Water Board, visited the water-works in Upper Teesdale; inspecting the Hury and Blackton reservoirs, the filter-beds at Lartington, and other works in course of construction. The works were explained by Alderman Hugh Bell, the Chairman of the Board, who stated that the storage capacity of the Hury and Blackton reservoirs was 1300 million gallons, and that the quantity of water they contained at present was 600 million gallons. The Board were supplying 81 million gallons per week to the Teesside towns for domestic and manufacturing purposes; and the growth of the population and their industries would necessitate the Board considering very shortly the construction of the Grassholme reservoir, which would occupy about ten years.

The Gas Tramway at Blackpool.—A Company has been formed to take over, as from June 30, 1898, the tramway constructed under the Blackpool, St. Anne's, and Lytham Acts, and to find the necessary additional capital for its development. The tramway starts in Lytham Road, Blackpool, and passes through St. Anne's-on-the-Sea to Lytham, with power to extend. It forms part of the extensive coast tramway, about 18 miles long, which unites Fleetwood, Blackpool, St. Anne's, and Lytham. The line is at present worked by the gas-motor system; but the Company will, at a latter period, adopt the mode which may be found most effective and economical, subject to the approval of the Board of Trade and the Corporations and District Councils through whose districts the system runs. Great success has attended the undertaking; and further cars are necessary to cope with the increasing traffic. Messrs. R. Brutton and Co., chartered accountants, certify that for 20 weeks in the 1898 season the takings were £6281; and during this period, 512,954 passengers were carried.

Gas Poisoning Case in Glasgow.—An elderly widow named Allen, residing with her son in Dumbarton Road, Glasgow, was found unconscious in bed last Friday week suffering from the effects of gas poisoning, and subsequently died in the Western Infirmary.

Failure of the Gas Supply at Bournemouth.—A very unusual mishap occurred at Bournemouth last Sunday evening. The town, so far as the gas supply was concerned, was suddenly enveloped in darkness. Soon after seven o'clock the gas went out; and at many places of worship the services had to be terminated. Great inconvenience was caused at the Post Office; and the streets were in darkness.

Extension of the Prepayment System of Gas Supply.—The Directors of the Brynmawr and Blaina Gas Company decided last month to lay on gas to workmen's cottages, and to supply and fix suitable fittings, in two positions, together with a prepayment meter, free of all cost to the householder, on receiving from the owner of the house an acknowledgment that the pipes, fittings, and meter so supplied were the property of the Company. In addition, they undertook to provide a kettle-boiler for the preparation of early breakfast. The Company's Manager (Mr. T. Acland), in a handbill issued by him intimating the Directors' decision, and setting forth the advantages of gas, emphasized the fact that the consumer would have nothing whatever to pay beyond the pence dropped into the slot of the meter. The class appealed to showed their appreciation of the generous offer by promptly accepting it; and the result has been that the Board, at their meeting last Wednesday, decided to place with Messrs. Willey and Co., of Exeter, the order for fitting up the first hundred houses, including the necessary services, on condition that the work should be completed within a month, when they will repeat the order with respect to one or two hundred more houses.

Threatened Calcium Carbide Litigation.—The following is taken from the current number of the "Ironmonger": "'Are we about to have the same difficulties in regard to calcium carbide as we had to meet in the earlier years of the incandescent light?' This question will be asked by many ironmongers when they learn that the Acetylene Illuminating Co., Limited, have commenced an action against the Midland Acetylene (Parent) Syndicate, Limited, for an alleged infringement of their patent rights, and have followed it up with the customary warning to the trade. And the average ironmonger, continuing his soliloquy, will mentally add: 'If we are in for another interminable wrangle in the Law Courts, with minor actions against individual ironmongers, and writs and threats of writs innumerable, the less we have to do with calcium carbide, and consequently with acetylene, the better.' Happily, however, the question may still be answered in the negative—if only the Acetylene Illuminating Company can be brought to perceive that a certain sufficiency is better than a problematical surfeit, and can be persuaded to retire from their position before the conflict assumes a more serious form. We have no desire at this time to go into the merits of the case; but we would ask the Acetylene Illuminating Company, Limited, to consider well their chances of success in the Courts, and, even if assured upon the point, to weigh further how far their success will benefit them, not only now but in the future, and also in how far it will benefit the trade."

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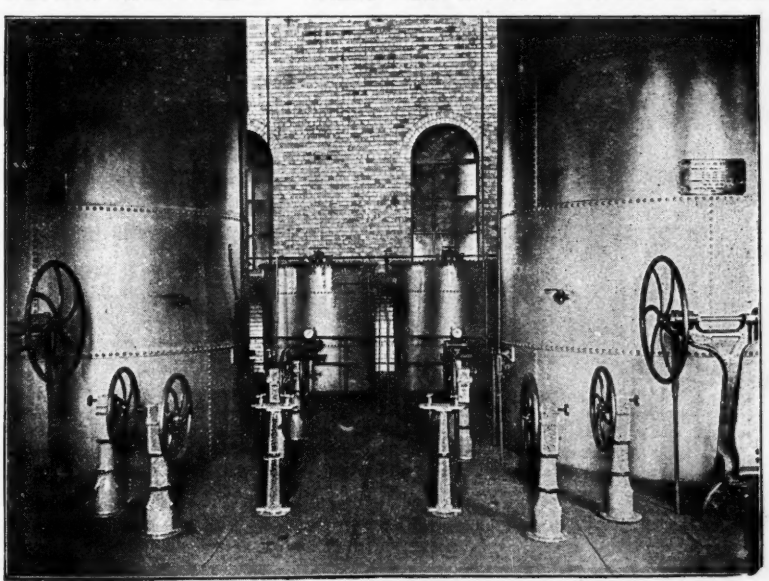

RESULTS PROVE EFFICIENCY.

Working Floor of Generator House. One Quarter Section of Birmingham Plant, Windsor Street Station.
The Maximum Daily Capacity of the Birmingham Corporation's Plant, which was erected by this Company, is 10 MILLION CUBIC FEET.

Strike of Stokers at Carnarvon.—In consequence of dissatisfaction among the stokers at the Carnarvon Gas-Works, they some days ago tendered their notices to cease work. The Manager (Mr. W. M. Ruxton), however, was able, with unskilled assistance, to keep the town supplied with gas; and a number of new men were subsequently engaged. At the meeting of the Gas Committee of the Corporation last Tuesday, Mr. Ruxton's action was upheld and his services recognized.

Sales of Stocks and Shares.—Mr. J. Shoesmith (Messrs. Davis and Shoesmith) recently sold some 5 per cent. preference shares (£10) in the Elland Gas Company for £13 each, and a few 2 per cent. preference shares of similar nominal value for £5 apiece. Some ordinary £10 shares in the Company were purchased for £30 each. At a recent sale of "D" (7 per cent.) stock of the Tonbridge Gas Company, on which a dividend of 8½ per cent. is being paid, the prices realized ranged from £210 to £210 10s. per £100 of stock.

Reading Water Supply.—At the last meeting of the Reading Town Council, the Chairman of the Water Committee (Alderman Hill) referred to the unprecedented period of drought through which the country has been passing, and remarked that it reflected great credit on the Manager of the works (Mr. A. T. Walker) and the staff that there had not been five minutes' intermission in the supply of water for all purposes. On one day they had sent out something like 3,545,000 gallons of water; and throughout the summer the supply had averaged 45 gallons per head per day to a population of 70,000—a fact few towns could boast of. There were no signs that, even if the drought continued, the people of Reading would suffer in any way.

New Joint-Stock Companies.—The "Positive" Meter Company, Limited, has been registered with a capital of £110,000, in £1 shares, to acquire any patents, inventions, and rights relating to meters for gas, oil, water, electricity, or other fluids or forms of power; to carry on the business of meter manufacturers, electricians, gas, hydraulic, and mechanical engineers, metallurgists, merchants, contractors, suppliers of gas and electricity, &c.; and to enter into certain agreements. The St. Margaret's Gas Company, Limited, has been formed with a capital of £5000, in £5 shares, to carry on the business of the Company at St. Margaret's, Herts. The Southerndown Water Company, Limited, with a capital of £4000, in £10 shares, will carry on the general business of a water company at Southerndown, St. Bride's Major, and elsewhere in Glamorganshire.

Wallasey Gas Supply.—On Friday, Mr. W. O. E. Meade-King held an inquiry at the Public Offices, Egremont, regarding an application by the Wallasey District Council for permission to borrow £40,000 for gas purposes. Mr. H. W. Cook, the Clerk to the Council, stated their case, and said that the most urgent needs were gasholders, purifiers, mains, governors, and scrubbers. The output for the year was estimated at 1,250,000 cubic feet as a daily maximum, which would be also the quantity of storage to be obtained under the extended scheme. Notwithstanding the demand for electricity, the gas consumption was strongly maintained. He pointed out that in November, 1897, Major Crozier held an inquiry on the gas scheme, and it was to amend this in several particulars that the present application was made. There was no opposition to the application.

The Use of Gas-Stoves in Southport.—In his address to the ratepayers on seeking re-election for the West Ward of Southport, Mr. J. J. Barlow says: "I think it is generally acknowledged that the hiring and selling on the hire-purchase system of gas-cookers by the Corporation has been of advantage to the ratepayers. Since the resolution which I moved in the Council empowering the Gas Committee to do this was passed, no fewer than 1446 cookers have been sent out; and the consumption of gas has risen from 19 million cubic feet in 1895-6 to 57 million cubic feet in 1897-8. These figures speak for themselves."

The Public Lighting of Liverpool.—At the last meeting of the Lighting Committee of the Liverpool Corporation for the present municipal year, the Chairman (Mr. C. Petrie), replying to a vote of thanks for his services, gave some particulars as to work accomplished. Referring to street lighting, he said the work included the adoption of incandescent gas lighting in 37 miles of streets, the fixing of lamps in 253 passages, the lighting of 2½ miles of new streets, and the lighting of 8695 back doors. The total road mileage to date of incandescent gas lighting amounted to 76¼ miles, and of electric lighting to 3¾ miles. With regard to the Electricity Supply Department, he said at the end of September last year the equivalent of 16-candle power lamps connected to the mains was 60,450; at present it was 79,589. Probably the most important piece of work carried out during the year was the change of pressure from 110 to 230 volts.

The Gas-Works Purchase Question at Swansea.—This matter is still under discussion in the "Cambrian." Dealing with the figures given in the "JOURNAL" last week, Mr. H. A. Thomas of Cheltenham, remarks that, unfortunately, the gentleman who put them forward has reckoned entirely without his host. He has forgotten that the Company cannot be compelled to sell their undertaking; and there is not the slightest likelihood of their consenting to part with it on so "absurdly inadequate" an estimate. Mr. Thomas says: "The one little peg on which your correspondents attempt to hang their arguments is the present price of gas. They forget that it is useless to compare the price at Swansea with that of towns where a supply of suitable gas coal is easy to obtain. Besides this, the Company have recently spent enormous sums in extending their mains for many miles in districts which are still undeveloped. When these become remunerative, the Company will no doubt be enabled to reduce the price. Certain it is that if the Company cannot supply the gas at a lower rate, neither would the Corporation be able to do so—that is, without working the undertaking at a loss. The Corporation certainly might reduce the gas to any extent they chose, and come upon the general body of ratepayers to make up the consequent loss. But this procedure would, I think, hardly find general acceptance, and certainly would be a long way off relieving the rates in the way so airily suggested by one or two correspondents." He says the rage for municipalization has about reached its limits; and he seriously recommends the municipal authorities and their advisers to leave these chimerical schemes alone, and apply their minds to some direct and more feasible method of "reducing the burden which lies so heavily on the tradesmen and other ratepayers of Swansea."

TWO HEROES.

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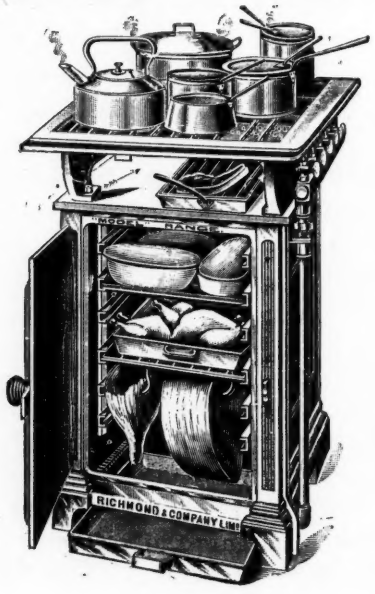

The Protection of the Belfast Water Supply.—In order to guard more effectually the water supplies of the Stoneyford, Woodburn, and Lough Mourne works against the possibility of pollution, the Belfast City and District Water Commissioners last Thursday resolved to apply to Parliament for power to acquire compulsorily so much of the catchment area of these works as may be requisite for the purpose. The Chairman of the Works Committee (Mr. R. Corry) fears that the carrying out of this proposal will add considerably to the rates.

Ledbury Water Supply.—Last Thursday, the Ledbury Urban District Council decided upon a scheme for obtaining a plentiful supply of pure water. The members discussed the matter with the Engineer, Mr. R. E. W. Berrington, of Wolverhampton. He fully explained it, and said there was an abundant supply of excellent water. He recommended that a reservoir should be made at the Cross Hands. The water would be pumped from Wassington, a distance of one mile, to the reservoir, and then flow by gravitation over the whole of the Urban district. He estimated the cost of the scheme at £5500, including pumping-house, mains, reservoir, &c. The scheme was adopted almost unanimously; and it was resolved to apply to the Local Government Board for sanction to borrow the money.

Glastonbury and its Water Supply.—A special meeting of the Glastonbury Town Council was held last Saturday week, for the purpose of passing certain resolutions previous to taking steps for obtaining a better water supply; the town being on the verge of a water famine. The first resolution proposed was: "That the Council do promote a Bill in the next session of Parliament to authorize the Council to construct water-works and supply water both within and without the borough, and for other purposes." It was pointed out that parliamentary powers would cost about £500; but it was considered much better, and in the end cheaper, to obtain them than to apply for a Provisional Order from the Local Government Board. Another resolution was also carried that the cost of the Bill should be defrayed out of the general district rate for the present, and ultimately out of the money which will be borrowed under its provisions.

Progress of the Birmingham Water Scheme.—The Water Committee of the Birmingham City Council completed on the 8th inst. their annual inspection of the works in course of construction in the Elan Valley for giving the city a pure and abundant supply of water from Wales. The visit extended over three days; and a fairly comprehensive idea was obtained of the progress made. On leaving Birmingham, the party made the first halt at Dolau, and from that point inspected the section of the aqueduct away to Rhayader. Everything was found in a satisfactorily advanced state; most of the cut-and-cover work being actually completed and the ground cleared. The second day was principally devoted to an inspection of the three dams on the Elan; and there, again, definite results were beginning to show. The open weather during the past winter, and the exceptional dryness of the summer, have combined to facilitate the progress of operations; and to this may be attributed very largely the considerable advance which was apparent in the extensive work of excavation. The Committee returned to Birmingham satisfied with the progress made in the various branches of this important undertaking.

Rural Water Supply.—The "Builder" says on this subject: "The shortness of water in the rural districts, owing to the dry weather of the last winter and summer, is little less, in many places, than a public calamity. Wells which are usually relied on to supply villages are dry, and water has to be fetched from long distances, and even paid for. It is to be hoped that this general and noteworthy scarcity may draw attention to the need for a better system in rural districts. The storage of rain water is almost wholly neglected. Thus a small and occasional rainfall, which would help towards the supply if stored, is absolutely lost; it never reaches the springs and wells. Again, it would not be difficult in many places to establish a small company who would sink a good well and supply the district. Parish councils may also do much, by keeping wells clean, and by establishing communications between villages and deep and distant wells, to improve the supply in the more populous rural districts. Nothing can, of course, compensate for the absence of a really constant supply, which cannot be expected in other than populous districts. On the other hand, the present state of things in rural districts might be greatly improved."

The Flow of Water from the Chalk Cliffs of Kent.—Mr. G. T. Pardoe, of Littlehampton, has written to the "Standard" on the above subject as follows: "The results obtained from the measurements of the outflow from the chalk are decidedly interesting, but might have been foreseen. It has been found by numerous experiments that the velocity (and therefore quantity) of flow of water in hydraulic channels is only slightly dependent on the slope of the channel, especially when such channel offers a considerable resistance, of which kind of channel, chalk, being porous and traversed by fissures running approximately north and south, may be taken as an example. Chalk, being porous, will absorb about two to two-and-a-half gallons of water to each cubic foot before the water stands on the surface; and if more water is applied, as by rain, to saturated chalk hills at a higher level, the surplus will more or less quickly drain off, and appear at a lower level as a spring. It is this that causes the appearance of an intermittent stream, known as the Nahlbourne, which runs down the valley at the back of the Hougham cliffs between Dover and Folkestone, each spring, and for a length of time dependent on the wetness or dryness of the preceding winter and early spring. It is possible that comparison of the rainfall over the country adjacent to this stream and the volume of its flow would give some interesting results. I should remark that in wet years the line of saturation in the chalk near to the sea will stand higher than in dry years, and that, consequently, the slope of the water surface landwards will be greater in wet years; but, as pointed out, this slope has not a very marked effect in increasing the outflow from the base of the cliffs."

The Derwent Water Schemes.—We recently briefly noticed a conference of Derbyshire District Councils on the subject of the schemes for the appropriation by various towns of the waters of the River Derwent for water-supply purposes. The conference was a private one; and consequently little transpired at the time as to the result. However, at the meeting of the Chapel-en-le-Firth District Council on Monday last week, the Clerk (Mr. J. B. Boycott) presented a report on the proceedings. It seems that there was a strong feeling among those present at the conference that measures should at once be taken for protecting the interests of the District Councils who are likely to be affected by the schemes; and there was a unanimous opinion that the Councils should form an Association for the purpose of taking united action, and to advance their interests generally. Resolutions to this effect were passed; and it was also decided to send a circular to each District Council asking them to join the Association. A Provisional Committee was appointed to confer with the Health Committee of the Derbyshire County Council in any case of emergency. Mr. Boycott added that it was proposed to ask the promoters of the schemes to insert clauses in their Bills to enable District Councils, either separately or by two or more combining, to be supplied, where practicable, from the mains, on terms to be agreed upon. An amicable agreement would be far more preferable than opposing the Bills in Parliament; but it was evident that if such opposition was to be avoided, and a friendly understanding arrived at, it would be necessary to incur some slight preliminary expenses in co-operating with the other District Councils. He therefore asked the Council, if they approved of what was being done, to pass a resolution empowering the Committee already appointed to incur any reasonable expense in carrying out the necessary negotiations with the promoters. Resolutions were passed on the lines suggested.

Messrs. H. Greene and Sons, Limited, are removing their gas, lamp, and electrical departments to 19 and 73, Farringdon Road, E.C.

The Halifax Corporation have accepted the tender of Messrs. R. Dempster & Sons, Limited, of Elland, for the stage floors, hydraulic mains, coal hoppers, &c., for the inclined retort installation at their gas-works.

In the portion of the report of the proceedings of the Morley Gas-Works arbitration which appeared in the "Journal" last week, Mr. Chester's name was, by inadvertence, given instead of Mr. Hunt's in the sixth line of Mr. Valon's evidence on p. 820.

The Directors of the Bristol Gas Company have decided to issue £20,000 of general capital stock, bearing a maximum dividend of 5 per cent., and £5000 of new debenture stock; and, as lately announced in the "Journal," it will be offered for public competition by Messrs. G. Nichols, Smith, and Alder on the 27th inst.

In the London Bankruptcy Court last week the affairs were examined into of Mr. R. M. Houldsworth, of 7, Fenchurch Avenue, E.C., a company promoter who, among other schemes, had been interested in the promotion of the White and Middleton Gas-Engine Company, Limited, concerning which particulars appeared in our pages recently. The debtor's ranking liabilities were returned at £19,189; and the assets, at £3909.

The Leeds Fire-Clay Company, Limited, have been entrusted by the Burton-upon-Trent Corporation with the order for nine through settings, of eight retorts each, of their shallow regenerative type, including excavations, foundations, subways, chimney, &c. The retort-house is at present being built for receiving them. The Company have just completed, among other work, installations of shallow regenerators for the Boston, Ripon, Whitworth, and Yeadon and Guiseley Gas Companies.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale than all other Oxides combined. Purity and uniformity of quality guaranteed.

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Andrew Stephenson, Agent. All communications re Oxide to the Company as above.

WINKELMANN'S "VOLCANIC" and "VOLCUM" CEMENT. Fire Resistance up to 4500° Fahr. In use in Gas-Works all over the World.

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Telegrams: "Volcanism, London.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, Oldham.
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SULPHURIC ACID.

JOHN NICHOLSON & SONS, Limited, Chemical Works, Leeds, specially produce this ACID from SULPHUR, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

PORTER & CO., Gowts Bridge Works, LINCOLN, Engineers, Ironfounders, and Contractors for the erection of Gas-Works for Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings at home and abroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.
Telegraphic Address: "Porter Lincoln."
[For Illustrated Advertisement, see Oct. 4, p. 780.]

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BALE & CO.'S Oxide of uniform quality. SPECIAL FIRE CEMENT, OXIDE PAINTS, OILS, SULPHURIC ACID, &c.
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Brotherton and Co., Chemical Manufacturers Works: Birmingham, Leeds, and Wakefield.

SADLER & CO., Ld., Middlesbrough; Ulverston (Barrow); Portsmouth; Carlton (N.E.R.); and Stockton. Tar and Petroleum Distillers. Benzol and Petroleum Spirit, 700 and other Gravities specially prepared for Carburetting. SOLAR OIL for Gas Making, Kerosene, &c.
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NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of, PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAY.

BROTHERTON & CO.
Offices: Commercial Buildings, LEEDS. Correspondence invited.

TUBES for Gas, Steam, and Water (all Sizes) Welded or Riveted. TANKS, HYDRAULIC MAINS, RETORT-LIDS, &c.
JOHN SPENCER, Globe Tube Works, WEDNESBURY; and 14, Great St. Thomas Apostle, LONDON.

HUTCHINSON BROTHERS, Gas Engineers, &c., Falcon Works, Barnsley, Makers of Wet and Dry Gas-Meters, Brass-Work, and general Gas Apparatus, Lead Saturators, Tanks, &c., Tools, and Gas-Works Sundries. (See p. 840, last week's issue.)
Telegrams: "HUTCHINSON BROS., BARNSLEY."

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JOHN ROMANS & SON, EDINBURGH, Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS and WATER WORKS.
Prices, &c., will be forwarded on application to No. 30, ST. ANDREW SQUARE, EDINBURGH, / NEWTON GRANGE, NEWBATTLE, DALKEITH, } SCOTLAND.

PATENTS FOR INVENTIONS.

J. C. CHAPMAN, M.I.M.E., and Fel. Chartered Inst. Patent Agents. ADVICE ON ALL MATTERS CONNECTED WITH ABOVE. Information and Handbook on application.
70, CHANCERY LANE, LONDON, W.C.

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HYDRATED OXIDE OF IRON.

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Two or three times as rich as Bog Ore.
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Less than half the price of Bog Ore.
Can be lent on hire.
Write for tabulated results.
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SULPHATE OF AMMONIA SATURATORS.

JOSEPH TAYLOR & CO., Chemical Plumbers, &c., and Makers of every description of Solid Plate Lead and Timber Cased Saturators, &c., CENTRAL PLUMBING WORKS, TOWN HALL SQUARE, BOLTON. Special attention to Repairs.
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Apply to the BRIMINGTON CARBON COMPANY, Sowerby Bridge, YORKS.

WANTED, Carbon in 4 Ton Lots, or more; also OIL CARBON.
State Price, f.o.r. at nearest Station, to No. 3081, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

SITUATION wanted by a Practical Man as MANAGER or FOREMAN of Gas-Works. Thoroughly conversant with every detail in the Manufacture and Distribution of Gas, Generator and Regenerator Furnaces, Mains, Services, and Meters. Good References. Married.
Address MANAGER, Gas-Works, Somerton, SOMERSET.

A MANAGER of Gas-Works is open for an engagement. Many years' experience. Able to superintend the latest methods of Retort Setting. Well acquainted with Sulphate Manufacture, and all the routine of a Gas-Works.
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WANTED, a good Gas-Fitter, used to Gas-Works preferred. Wages, 25s. per week.
Apply, by letter, to No. 3147, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ROTHERHAM CORPORATION GAS DEPARTMENT.

WANTED, Stokers for above Works. Regular employment to suitable Men.
Apply to F. A. WINSTANLEY, Engineer and Manager.

WANTED, Gas Stoker, used to Shovel Charging. Permanent Situation for a steady, suitable person. Single Man preferred. Wages 30s. per week.
Apply, with References, to T. ACLAND, Engineer, Gas-Works, Blaina, MONMOUTHSHIRE.

WANTED, Retort Ironwork for two Settings of Sizes; including HYDRAULICS, 5-inch or 6-inch DIPS and ARCH PIPES, and one BRIDGE-VALVE. Also twelve MOUTHPIECES and LIDS, 21 in. by 15 in., if Patent Lids, Oval or Circular.
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MAIN and Service Layer wanted. Permanent Job to a really good Workman, who is willing to make himself generally useful on the Works.
Apply, by letter, stating Age, whether Married or Single, and Wages required, and enclosing *copies only* of Testimonials, to No. 3146, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Luton Water Com- pany, an OFFICE CLERK, age not less than 18. One who has had experience in a Water-Works Office preferred. Salary £60 to £70 per year.
Apply, by letter, on or before the 22nd of October, 1898, with not more than three Testimonials, addressed to the CHAIRMAN, Luton Water Company, Crescent Road, Luton, BEDS.

PARTNER, with £1000, wanted to carry into effect an idea in connection with Incandescent Light which has proved paying in various Continental Cities.
Principals or their Solicitors only need apply to Box 5794, care of Neyroud's Advertising Agency, 14, Queen Victoria Street, LONDON, E.C.

WANTED, a Working Foreman for a small Gas-Works near Newcastle-on-Tyne. Applicants must have had experience with Regenerative Furnaces and Exhausters, and possess a thorough knowledge of Gas Manufacture, including Washing and Purification.
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RUTHIN GAS COMPANY.

WANTED, by the Ruthin Gas Company, a Steady, Practical Man as WORKING MANAGER. Must be a good Carbonizer, used to Engine and Exhauster, and able to take Indices of Meters. Assistance provided. Wages 30s. per week, with House and Garden, and Coal and Gas. Annual make, about 5 Millions.
Applications (stating Age), with References and Testimonials as to Ability and Character, to be sent to Mr. DAVID JONES, Secretary, Gas Company, Ruthin, NORTH WALES, by Tuesday, the 25th day of October inst.

WANDSWORTH AND PUTNEY GASLIGHT AND COKE COMPANY.

GENERAL Foreman wanted im- mediately for the above Works.
Wages £3 10s. per week, with House, Coals, and Gas free.
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As the present Foreman is retiring from ill health, applicants should state when, if appointed, they could take up the duties.
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THE Johannesburg Town Council are prepared to receive TENDERS for a complete CARBURETTED WATER-GAS PLANT.
Particulars and Specifications can be obtained from Messrs. Robert Whyte and Co., 22, Bury Street, St. Mary Axe, E.C., or from the General Manager, Lighting Department, Johannesburg Town Council, Z.A.R.
Tenders closed at Johannesburg by Jan. 6, 1899.
The lowest or any Tender not necessarily accepted.

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GAS-EXHAUSTERS AND STEAM-ENGINES
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FIRE-CLAY GOODS.

THE Directors of the Sheffield United Gaslight Company invite TENDERS for the supply of FIRE-CLAY and GANNISTER GOODS (Retorts, Bricks, &c.), required for Renewals and Repairs at their Neepsend and Effingham Street Stations during the next Twelve Months.

Specifications and Forms of Tender may be had on application to the Company's Engineer, Mr. Fletcher W. Stevenson.

The Directors do not bind themselves to accept the lowest or any Tender.

Sealed Tenders, marked "Tender for Fire-Clay Goods," addressed to the undersigned, must be delivered by post not later than the first post on Thursday, the 3rd of November.

HANBURY THOMAS,
General Manager and Secretary.

Commercial Street, Sheffield,
Oct. 7, 1898.

SALE OF GAS SHARES.

THE Hastings and St. Leonards Gas Company, pursuant to their Act of 1883, and to a Resolution passed at the Ordinary General Meeting held on the 1st day of September, 1898, invite TENDERS for 500 SHARES, of £20 each (being a further part of the Company's Additional Capital sanctioned by the above Act), to be sent to Messrs. W. B. Young and A. E. Young, Bank Buildings, Hastings, the Joint Secretaries of the Company, on or before the 2nd day of November next.

The minimum Price of the Shares has been fixed at £18 10s. per share; and no Tenders under this price will be entertained.

The whole amount, including Premium, will be payable to the Company's Account at the London and County Bank, Hastings Branch, on or before the 1st of December next; and the new issue will be entitled to its first Dividend from that date to the 31st of December, 1898, after the declaration of Dividend in March next.

Tenders may be made for any number of Shares; and Forms of Tender, and any further Particulars, may be had of the Secretaries.

W. B. YOUNG,
A. E. YOUNG,
Joint Secretaries to the Hastings and St. Leonards Gas Company.

Bank Buildings, Hastings.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held MONTHLY, at the Mart, Tokenhouse Yard, E.C.

He also undertakes the issuing by Auction of Gas and Water Stocks and Shares under Parliamentary Powers.

Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. Alfred Richards's Offices, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
BRENTFORD GAS COMPANY.

£15,000 OF NEW STOCK 1881.

Ranking for a Standard Dividend of 7 per cent. per annum, subject to the Sliding-Scale; the last Dividend on similar Stock having been at the rate of 9 per cent.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, Tokenhouse Yard, E.C., on Wednesday, Nov. 23, at Two o'clock precisely, in Lots.

Particulars may be obtained of the SECRETARY of the Company, at the Offices, BRENTFORD; and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
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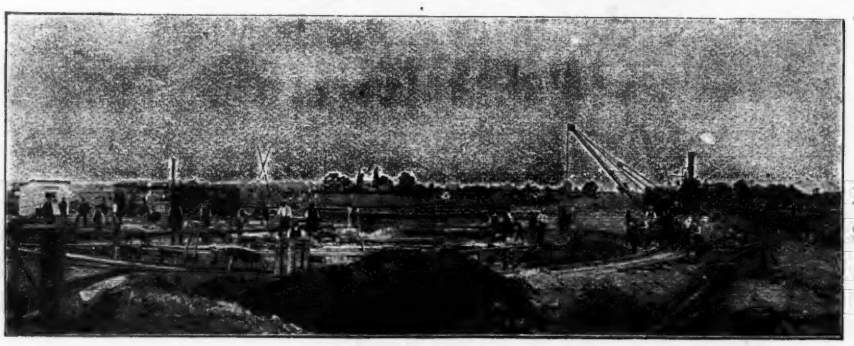
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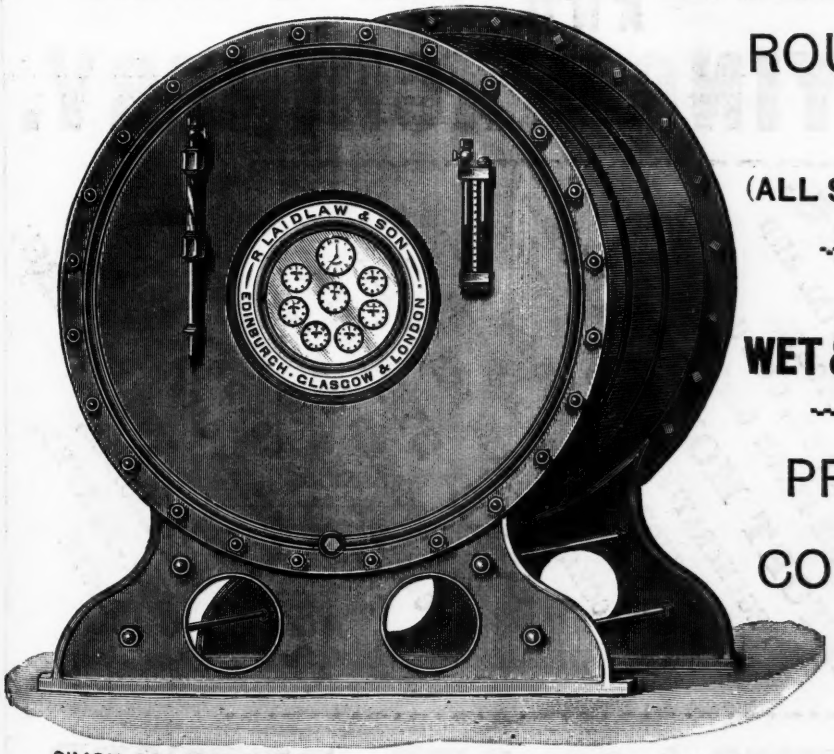

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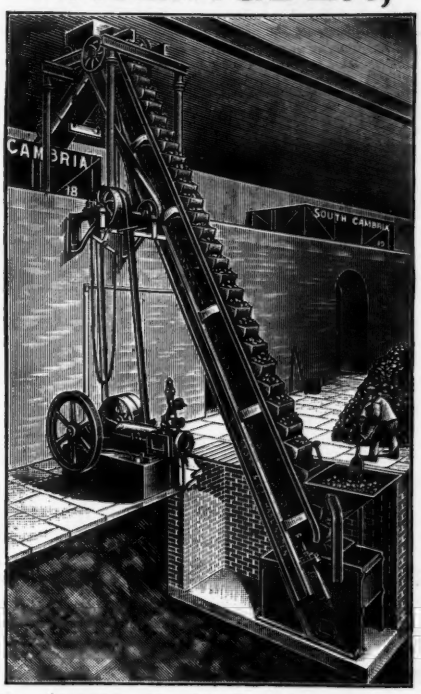

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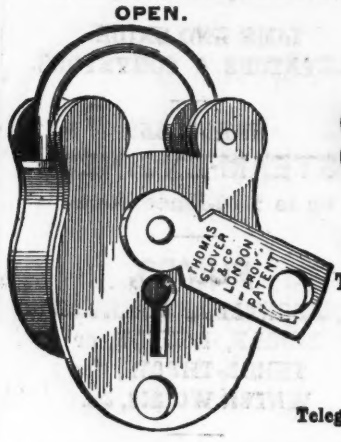

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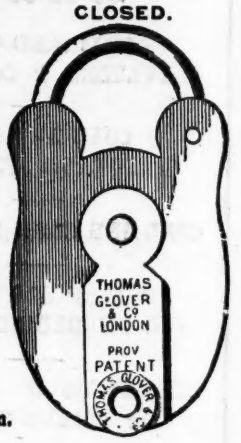

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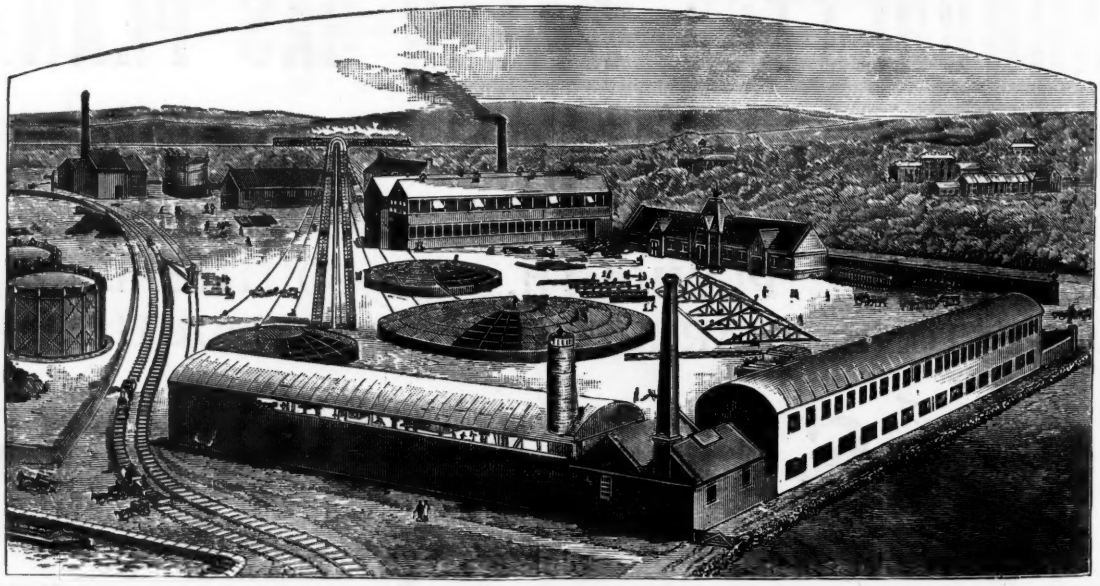

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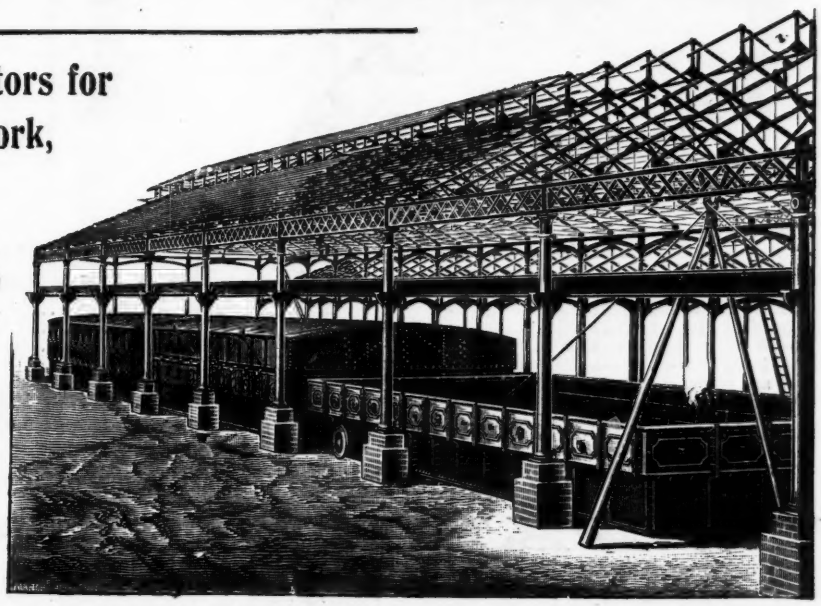

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Massive and Bold in Design.
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[See also Advt., p. 856.

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